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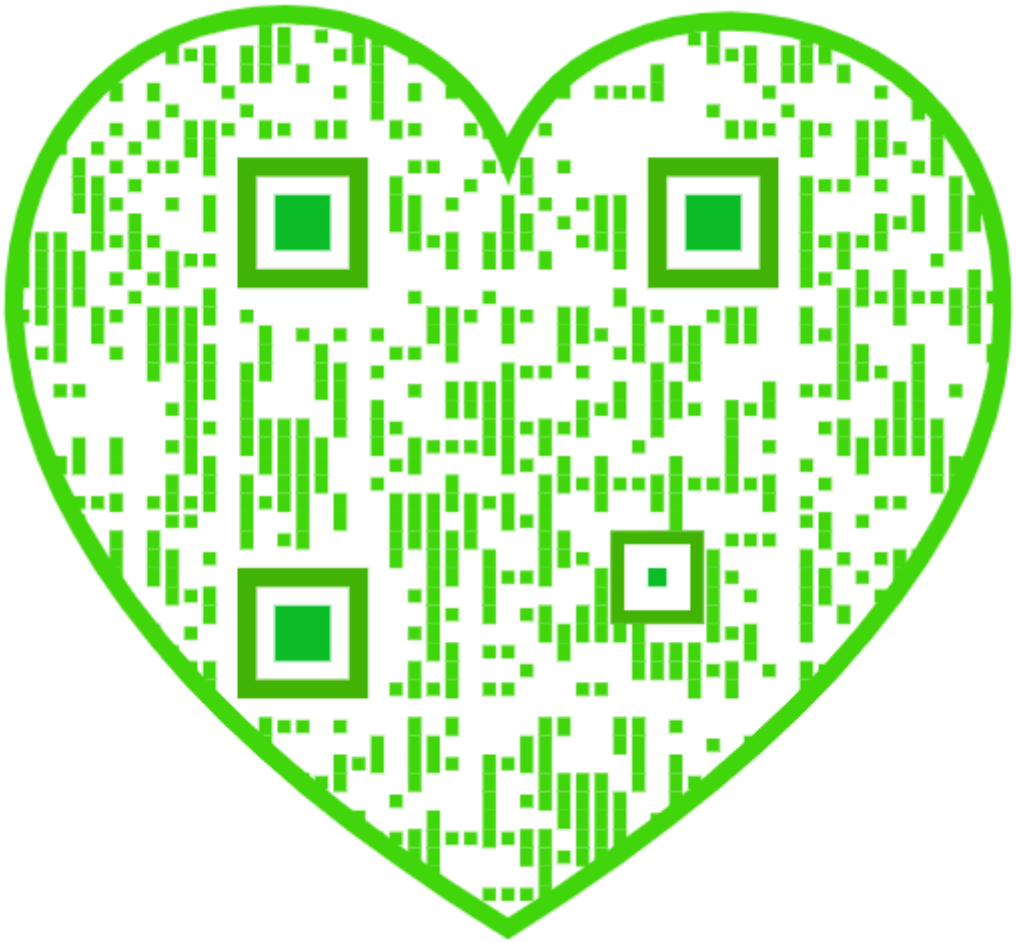

ILLUSTRATED

DESCRIPTIVE CATALOGUE

OF

American Grape Vines.

A

GRAPE GROWERS' MANUAL

BY

BUSH & SON & MEISSNER,

VITICULTURISTS AND PROPRIETORS OF

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ST. LOUIS, MO.

R. P. STUDLEY & CO., PRINTERS, LITHOGRAPHERS AND MANUFACTURING STATIONERS.

1895.

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PREFACE TO FOURTH EDITION.

1894.

A book of which, twenty-five years after its first publication, a new edition is demanded, a mere Grape-Catalogue which has been read by the people of many nations and translated into many of the principal languages of the civilized world, requires no excuse for its republication. Its third edition (1883) was received with such favor by the public and the horticultural press, that the demand for it exceeded our expectations. The entire edition was soon sold out, many orders for copies remaining unfilled. The question why a new edition did not make its appearance long since may therefore be raised.

At the time when we Americans gloried and rejoiced in having saved the French vine by means of our Phylloxera-resisting varieties, at the time when we had reconstituted her ravaged vineyards, our own were suffering from the annually increasing fungoid diseases of the grape. Rot and mildew became so destructive and discouraging that grape-growing, to a large extent, east of the Rocky Mountains, was considered a failure until some preventive or remedy for those diseases might be discovered. At the same time the finest European grapes were grown so successfully and abundantly in California that the price of wine and table-grapes was reduced below the cost of their production in this part of the United States.

But owing to the fact that some exceptionally favored regions were exempt from cryptogamic maladies, and to the love and enthusiasm entertained for the grape by some of its old cultivators, its culture was still maintained.

Now, however, with the discovery of a remedy for grape diseases, renewed confidence to successful grape-growing has been inspired and, encouraged by many of our veteran viticulturists, we yielded to the flattering demand for a new edition.

Mr. B. T. Galloway, Chief of Division of Vegetable Pathology, U. S. Department of Agriculture, has kindly prepared for this edition an article on the Diseases of the Grape and their Treatment.

The classification of the true grape-vines, by our late Dr. Geo. Engelmann, — the last work of this great botanist, — has been continued, as it were, by the studies and observations of Prof. T. V. Munson, illustrated by photo-gravures from nature.

Prof. C. V. Riley, whom health considerations forced to resign the honorable position of Chief of U. S. Entomological Department, before his departure for Europe, kindly revised the article (contained in previous editions) on Insects of the Grape.

The excellent treatise on grafting, after the French of the late lamented Aimé Champin, also the articles on planting, training, pruning and wine-making, have been revised and enlarged by us with the kind assistance of eminent practical viticulturists.

In fact, the *Grape Manual* is largely a new work, containing interesting, instructive and valuable information to the cultivator of the grape and furnishing a work rich in material for a record of past failures, present hopes and progress in viticulture.

Another improvement, herein attempted, is the descriptive part of our Catalogue, which makes it a complete dictionary of all American varieties, old and new; a very valuable feature long desired for various reasons, though objected to by some on account of excessive voluminousness. But the typographical arrangement employed makes the greater or less importance and general popularity of varieties recognizable at a glance.

The completeness of our list may also prove valuable to collectors and experimenters, and should aid producers of new varieties in avoiding the duplication of names.

We have endeavored to give correct and accurate descriptions, made clearer by many portraits, true to nature, and have tried to avoid overdrawn or exaggerated illustrations.

Yet, with all that, we are aware of deficiencies in this work, and while we feel as though we had fallen short of the end we aimed at, we still hope that, "after all, it will be of some use to mankind."

BUSH & SON & MEISSNER.

[FROM FIRST EDITION, 1869.]

Our success in grape growing, and in the propagation of grape-vines, has been highly satisfactory, in fact, far beyond our expectations. In view of the very great competition of even large, well-known and long-established nurseries, this success is highly flattering, and has encouraged us to increase our efforts.

We do *not* pretend to furnish "*better and cheaper* vines than can be afforded by any other establishment." All we *do* claim is, that we hope to *merit* a reasonable share of patronage, the continued confidence of our customers, and a fair profit.

In this connection, we cannot refrain from referring with a certain pride to the voluntary assurances of satisfaction we have received. Desiring to return our thanks to our customers in an appropriate and tangible form, and to respond to a desire often expressed by our correspondents, we concluded to present them with a fine *Illustrated and Descriptive Catalogue*, wherein the characteristic and relative merits of our different varieties are clearly stated.

We leave it to others to judge of its merits. We tried to produce something better than a mere price list, something that will be interesting and useful to progressive grape culturists, and have not spared time, labor or money in preparing it.

It has become customary to prefix to a Descriptive Catalogue of fruits and flowers some brief directions for their cultivation, and we have been urged to do the same.

We are aware, however, that some short and very incomplete directions, "a few hints," do more harm than good. They generally serve only to confuse the tyro or misrepresent grape growing as a very easy matter, requiring no larger outlay of capital, nor any more knowledge, skill and labor than is necessary to produce a crop of corn. This we do NOT wish to do. But, on the other hand, we are also aware that the excellent but somewhat costly books on grape culture, by Fuller, Husmann, Strong, and others, are not purchased by every grape-grower. Moreover, considerable progress has been made in grape culture since these books were written. Thus we came to the conclusion that a short manual, containing plain directions in regard to the planting, culture and training of grape-vines, and offered for less than its cost, would be welcome: and while we lay little claim to originality, we hope that this Catalogue may afford pleasure and profit to some of those at least into whose hands it may come.

ISIDOR BUSH & SON.

[FROM INTRODUCTION TO SECOND EDITION, 1875.]

Six years, embracing the most disastrous and the most favorable seasons to grape culture, have elapsed since the first edition of this Catalogue. Our experience has been enriched, observations have been made on old and some *new varieties*, but above all, one circumstance, the discovery of the Grape Root-louse, the Phylloxera, has led to a new, RADICAL study of the American grape-vines.

Our business as grape growers and propagators assumed such large dimensions that we discarded the culture and propagation of small fruits, etc., and devoted all the space of our grounds, all our means, cares and attention to GRAPE CULTURE ONLY AND EXCLUSIVELY, for which we have unusual facilities, and a most favorable soil and location. This enables us to raise a superior stock, and to make it more advantageous to the public, and even to the leading nurseries of other branches of horticulture, to deal with us, whose grape-nursery business is now admitted to be one of the first and most extensive of its kind in the United States of America.

We owe our reputation to our determination to give complete satisfaction, and to deserve the entire confidence of our customers.

We have no seedlings of our own, and impartially recommend such varieties only, new or old, as have real superior merit, and while the demand compels us to disseminate some inferior varieties (*Hartford* for instance) and untried novelties, over-praised, perhaps, by their originators, our Descriptive Catalogue shall save the reader from some of the bitter disappointments which grape growers have so often experienced.

We have carefully endeavored to avoid all undue praise, and to mention the shortcomings of even our best varieties: we especially desire to warn against the error of considering ANY variety fit for universal cultivation. To this end a study of the CLASSIFICATION of our grapes in the *Manual*, is earnestly recommended. Many failures will thus be avoided which have blasted the hopes, so prevalent ten years ago throughout the country, with regard to grape culture.

[FROM PREFACE TO THIRD EDITION, 1883.]

The BUSHBERG CATALOGUE has become a *vade mecum* of American grape-growers; it has also been translated into French and Italian, an honor probably never before bestowed on any nurseryman's fruit catalogue. Its reprint has long been demanded, but we could not consent thereto until we had leisure to thoroughly revise it. The experience and researches of these eight years, since the issue of the second edition, enable us to rectify some of its defects, to speak more definitely of the merits and demerits of many varieties, then new and untried, and to add a very large number of NEW GRAPES which have since been produced or introduced.

The AMERICAN GRAPE has also become of greater and more comprehensive importance by virtue of its now well established Phylloxera-resisting qualities, and, though grown in Europe chiefly as a grafting stock for their favorite kinds, every variety has been tested there; thus enabling us to add to our own opinion that of the best foreign connoisseurs. Nor have we neglected to consult the views of other grape-growers, and to avail ourselves of the many valuable essays on the grape, written by eminent horticultural authors.

DR. GEORGE ENGELMANN, the celebrated botanist, has enhanced the value of our Catalogue by revising for it his CLASSIFICATION OF THE TRUE GRAPE-VINES OF THE UNITED STATES. He has, in fact, entirely re-written it. He has also favored us with a short essay on the DISEASES OF THE GRAPE—*Mildew* and *Rot*. We are well aware that this chapter is still very defective, nor can the subject be satisfactorily treated until scientific researches and experiments may have found some practical means of curing or protecting our vineyards from these pests, not less destructive to our vineyards than the Phylloxera to those of Europe.

In this revised edition will also be found a far more exhaustive article on GRAFTING than was presented in the former. Our experience in this now so important operation, and the excellent work of AIMÉ CHAMPIN, on the same subject, enable us to furnish a chapter which to many may be both valuable and interesting.

Assisted by Prof. C. V. RILEY, Chief U. S. Entomological Commission, we have been enabled to amplify the chapter on INSECTS by a brief account of the beneficial species, useful to the grape-grower.

At the repeated request of a large number of grape-growers, we have added a few hints on the subject of WINE-MAKING, which may not be quite useless to beginners, though we have not changed our opinion (expressed in former edition) as to the necessity of practical knowledge and experience, in order to succeed.

But far more than the GRAPE MANUAL has the DESCRIPTIVE part of this Catalogue been augmented.

The favorable and highly complimentary opinions voluntarily expressed by our most prominent horticulturists, with regard to the previous edition (1875), permit us to hope that this new one will meet with a still more favorable reception.

That it may be useful to our grape-growers and enhance their love of the noblest fruit and its culture, is the wish of

BUSH & SON & MEISSNER.

Bushberg, Mo., October, 1883.

TESTIMONIALS.

We could fill a book with voluntary testimonials of prominent Horticulturists, Grape-growers and Nurserymen, who favored us with their commands, and to whom we may confidently refer, but we flatter ourselves that our reputation is so well established, that testimonials are unnecessary.

Opinions of some Prominent Horticulturists and from the Press

ON THE THIRD EDITION.

[*From the* Hon. Marshall P. Wilder, *Mass., President American Pomological Society.*]

Dorchester, January 14, 1884.

"I was greatly pleased with your Catalogue, not only for its elegance and the useful information which it contains, but to see how enterprising you are in keeping up with the age in grape culture. Surely you have become an acknowledged authority."

Marshall P. Wilder.

[*From* Peter Barry, *of Ellwanger & Barry, Vice-President American Pomological Society.*]

Rochester, December 4, 1883.

"Your Grape Manual and Catalogue is a work of great value, issued in excellent style."

P. Barry.

[*From* Wm. Saunders, *Supt. Experimental Station, U. S. Department of Agriculture.*]

Washington, D. C., November 28, 1883.

"Such a work deserves more than the stereotyped form of compliment. It is at once the best Catalogue and the best Manual on American grapes that has yet been published."

William Saunders.

[*From* Prof. W. J. Beal, *Secretary American Pomological Society.*"

Lansing, Mich., November 30, 1883.

"It is a grand work—far ahead of anything of the kind I know of in this country."

W. J. Beal.

[*From* Robert Manning, Esq., *Secretary Massachusetts Horticultural Society.*]

Boston, December, 1883.

"The Bushberg Catalogue is a treatise on the Botany, Cultivation, Diseases, Insect enemies, and Varieties of American Grapes, rather than a Catalogue, as that is commonly understood. I am glad to know that the previous editions have been translated into French and Italian—an honor which they certainly deserved. I know of no better Manual of everything relating to American grapes. It should be in every public library, and in the hands of every American grape grower."

Robert Manning.

[*From the Originator of* Rogers' *Hybrids.*]

Salem, Mass., December 28, 1883.

"Thanks for your most valuable Catalogue of Grapes and Vines. It is the most valuable treatise on this subject I have yet seen. I notice one little inaccuracy, where you say the grapes of mine were produced in a small garden in *Roxbury, Mass.* It should read *Salem, Mass.*, where I now reside. Yours, truly,

Edward S. Rogers.

[*From* George Ellwanger, *Proprietor Mount Hope Nurseries.*]

Rochester, N. Y., December 27, 1883.

"It is a work of great value, and far in advance of any work of the kind."

Geo. Ellwanger.

[*From* Prof. T. J. Burrill, *of the Illinois Industrial University.*]

Champaign, Ill., November 30, 1883.

"It surpasses in interest and excellence anything of the kind with which I am acquainted, whether produced at home or abroad."

T. J. Burrill.

[*From* G. Onderdonk, *the Pioneer Viticulturist of Southern Texas.*]

Victoria, Texas, November 27, 1883.

"The old edition was very valuable, and the new edition is a vast improvement. You have done American viticulture a valuable service."

Gilbert Onderdonk,

[*From* Prof. T. V. Munson, Esq.]

Denison, Texas, December 1, 1883.

"I think your modesty in simply calling it a '*Catalogue*' does the great work an injustice. It is a most complete and valuable treatise on American grapes. . . . Its gems of knowledge will make it widely sought anyhow."

T. V. Munson.

[*From* D. S. Marvin, *Watertown, N. Y.*]

Watertown, December, 1883.

"I consider it the best work we have on native grapes. Its new features and expansions bring it up to date. It is invaluable to the grape-grower. I would not sell my copy for $5, without being able to replace it with another."

D. S. Marvin.

[*From* Prof. Planchon, *Director "La Vigne Americaine," etc.*]

Cette troisieme édition d'un ouvrage déja plein du valeur, est une oeuvre complétement ranouvellee par les additions et les modifications que vous y avez introduites. J'ai beaucoup engage Mons. L. Bazille à en faire la traduction. . . . Un livre que peut rendre en Europe des grands services et qu'il est bon de mettre à la portée du plus grand nombre de vignerons.

Planchon.

NOTE.—We regret very much the loss of a number of valuable testimonials destroyed by the great fire on last Christmas eve, which laid our St. Louis office in ashes.

Bush & Son & Meissner.

BRIEF EDITORIAL NOTES.

[*From the "Rural New Yorker." Feb. 23, 1884.*]

Bushberg Illustrated Catalogue of American Grape-vines. Bush & Son & Meissner, Bushberg, Mo.

I was glad to see, in a late number of the Rural New Yorker, some extracts from this excellent work, accompanied by illustrations of the most approved methods of grafting the vine, for this is probably one of the best and most practical articles on this subject yet published. I would like also to express my approval of the entire work, for it seems to have been written carefully and conscientiously, and certainly contains a larger amount of valuable information in reference to American grape-vines than any catalogue I have ever seen. The article upon the classification of American vines by means of their peculiarities of growth, the unfolding of the leaves, their wood-growth, and the size, weight and configuration of the seeds, is both curious and interesting, and is probably a step in advance toward the solution of a most difficult problem. The articles upon planting, pruning and cultivation are practical and good, and just what the novice requires to guide him to success. The articles also upon the diseases of the vine and upon injurious insects are full, and contain the latest and most intelligent views upon those subjects. In the catalogue and descriptions of the great number of American vines which have appeared, the writer, who is supposed to be the senior member of the firm, is doubtless influenced by his locality and also by his evident love for this "noblest fruit." In some instances he is, perhaps,

"To their faults a little blind,
And to their virtues very kind."

But, as a rule, I believe the descriptions are fair and unbiased, and as reliable as they could well be made. It is not only a very complete descriptive catalogue, but a valuable contribution to our stock of grape knowledge which deserves the thanks of all interested in the subject of American grape culture.

Delaware, Ohio. Geo. W. Campbell.

BRIEF EDITORIAL NOTES.—Continued.

[*From the "Cultivator and Country Gentleman" Jan. 1884.*]

Grape Catalogue.—We have received from Bush & Son & Meissner, of Bushberg Mo., their Illustrated Descriptive Catalogue of American Grapes and Grape Growers' Manual, a large pamphlet of 150 pages, half of which is occupied with very complete descriptions of the many known American varieties, and copious illustrated instructions are furnished for the management of the vines. A convenient descriptive index is given to the 240 descriptions. This catalogue appears to have been prepared with great care, and will be valuable to grape growers.

[*From the "Farmer's Home Journal," Louisville, Ky., December, 1883.*]

Grape Catalogue.—By far the most complete and valuable essay on the grape, its varieties and their culture, is the Illustrated Descriptive Catalogue, issued by Bush & Son & Meissner, Bushberg, Mo. We have received from them a copy of the third edition, which has just been issued. It is eight years since the second edition was prepared, and this latter publication contains the vast information and experience that have been accumulated during these years, so prolific in new varieties, and so full of investigation by men of science and skill. It is worth five times the price to any grape grower, and we urge every one to procure a copy, as they will find it invaluable as a work to study, and then to use as a book of reference.

[*From the "American Garden," N. Y., Dec., 1883.*]

Bush & Son & Meissner, Bushberg, Mo.—Illustrated Descriptive Catalogue of American Grape Vines. This handsome pamphlet, of over one hundred and fifty pages is not as its title might indicate, a mere nurseryman's price list. In fact, it contains no prices at all, but is a complete manual, treating of everything pertaining to the treatment and culture of Grapes. The descriptive list of varieties, up to the present time, is the most complete and reliable work of the kind ever published.

[*From the "Weekly Sun," New York, Jan. 9, 1884.*]

A. S. Fuller, Agricultural Editor.

A Valuable Catalogue.—We are frequently reminded of the great amount of valuable information that is being disseminated in dealers' catalogues, but have met none that excelled in this respect the Bushberg catalogue of grape-vines, published by Bush & Son & Meissner, of Bushberg, Mo. This is not merely a catalogue, but an extended treatise on the vine, commencing with a thorough scientific review and description of all our native species, written expressly for this work by Dr. George Engelmann, of St. Louis, who has probably given more time to the study of our indigenous grapes than any other living botanist. It next gives an essay on the diseases of the vine, which is followed by a chapter on insects injurious to it, and the various methods of propagation, all very fully illustrated. Full instructions in pruning and training the vines are also given, and, upon the whole, we do not hesitate to say that the work far surpasses anything of the kind ever published in any country or language for the price.

[Extracts from the Introduction to the French Edition.'85]

. . . "Le livre de MM. Bush et Meissner est plein des ensignements mutuals que les Etats-Unis et la France se sont donnés sur la culture des vignes résistantes, et cet echange de services nést hereusement pas près de cesser. . . . En tout cas, l'oeuvre de nos amis de Saint Louis, enrichie des savants travaux d'Engelmann et de Riley, gardait pour nous une originalité, une valeur de premier ordre au point de vue ampélographique. . . . Honneur donc et remerciements aux Ampélographes de Bushberg! leur travail est la base solide sur laquelle l'expérience de l'Europe, unie a celle de l'Amérique, édifiera peu à peu la connaissance scientifique et pratique des vignes Américaines."

J.-E. Planchon.

Montpellier, le 3 février 1885.

[*From the "National Tribune," Washington, D. C., December 6, 1883.*]

New Catalogue by Bush & Son & Meissner, Bushberg, Jefferson Co., Mo.

We make no hesitation in giving our opinion on the above, viz.: that we consider it the most valuable catalogue ever gotten up on American grapes. More than this, it is, in some respects, by far the best manual which has yet appeared on this subject.

[*From "Colman's Rural World," December, 1883.*]

Samuel Miller, Horticultural Editor.

The Bushberg Grape Catalogue.—We are often asked by beginners what work on grape-growing is the best to to get, and for a good while referred them to Husmann's work on grapes and wine. But this one above referred to, contains about all the information that the previous works have, and a large amount of valuable information never before published on the subject. For forty years I have been getting every work on the grape that I could hear of, and consider this of Bush & Son & Meissner the most valuable work of the kind yet published in the English language: and it should be in the possession of every man that grows grapes, or intends doing it. It teaches the beginner from the first start so plainly, that it is impossible to err, and the description of varieties along with the classifying the different families of grapes is complete.

[*From the "Rural New Yorker," December, 1883.*]

Elbert S. Carman, Editor.

The Bushberg Illustrated Catalogue of American Grape Vines, third revised edition. This is the most valuable treatise on the American grape ever published, and we should be glad if it were in the hands of every one of our readers.

[*From the "Gardener's Monthly," January, 1884.*]

Thomas Meehan, Editor.

Illustrated Descriptive Catalogue of American Grape-vines, by Bush & Son & Meissner.

This is really a scientific treatise, embracing everything that any one can want to know about grape-growing or wine-making, and we believe nothing like it has ever been produced by any horticultural business firm—certainly not in this country. Like all catalogues of nurserymen, it will be of great value to those who want to plant, and, unlike many, will have an honored place as a permanent addition to a well-ordered library.

[*From the "Ohio Farmer," January, 1884.*]

Bushberg Catalogue.—An excellent manual on the grape, containing over 150 pages. This is the third edition, revised and brought down to date. The instructions on planting, culture, selections, insects, diseases, etc., etc., are complete, and the catalogue invaluable to the grape grower, containing as it does descriptions of all recognized useful varieties.

Aus dem Vorwort zur deutschen Ausgabe, Berlin.

Bereits füllen Hunderte von Varietäten amerikanischer Arten die Kataloge, in welchen auch für unsern verwöhnten Gaumen vortreffliche Wein- und Tafeltraubensorten enthalten sind . . . . Die Firma Bush & Son & Meissner in Bushberg bei St. Louis, Mo., Besitzerin einer der größten Rebschulen, welche ihr Geschäft nicht nur vom praktischen, sondern auch vom wissenschaftlichen Standpunkte aus betreibt, hat schon vor mehreren Jahren einen Rebkatalog herausgegeben, welcher nicht allein mehrere Hundert amerikanische Arten und Varietäten aufzählt, sondern bei einer jeden die in Amerika und auch in Frankreich gewonnenen Erfahrungen über den Wert der Trauben und deren Widerstandsfähigkeit bespricht . . . . Diese bedeutende, mit zahlreichen Illustrationen versehene ampelographische Arbeit mußte bald in zweiter und dritter vermehrter Auflage erscheinen und als Beweis für die Vortrefflichkeit des Buches mag auch der Umstand angeführt werden, daß es bereits in französischer und in italienischer Sprache erschienen ist.

Klosterneuburg, Ostern 1885.

A. von Babo.

GRAPE MANUAL.

ORIGIN, CLIMATE AND SOIL.

THE GRAPE, the longest known, the earliest cultivated of all fruits, when and where did it originate? 'Neath what suns did the first grape-tendril twine into rich luxuriance? What hands gathered its first luscious berries? Who can tell?

Long before research folded back the curtains of time, long before the breath of history crystalized incident and event, the "amethyst clusters" of the grape ripened under sunny skies. Veiled in myth, clothed in the shades of the past, gleaming from legend and fable, it comes to us breathing suggestions of sylvan deities. Greek festivals and Egyptian rites. Biblical figures rise before us as we ponder on its origin, and Kings, whose very names are now forgotten, crowd by on time's remotest blue.

The bible itself tells us how, after the great flood, Noah planted a vine which, according to legend, was a gift from God, himself.

Greek mythology ascribes to Bacchus the honor of having brought the first vine from India; the ancient Thracians (Bulgarians) considered the vine a gift of Dionysus, the god of vegetation.

According to Egyptian tradition Africa owed the grape-vine to Osiris: grape-stones (seeds) were found with mummies from Egyptian tombs of more than three thousand years ago; as also among the remains of Swiss and Italian lake dwellings of the Bronze-age.

In Greece, wine was already in general use during the Homeric and Hesiodic times, and it was from the islands of the Ionian and Egean seas that the seeds of an inexhaustible civilization were thrown on the world.

Turning from myth to ancient history, we find that some three thousand and two hundred years ago, when Moses, leader of Israel, sent men to search the land of Canaan—their promised land—and bring of its fruit, two of these messengers, coming to Hebron, where, in the double cave of Abraham, their forefathers were sleeping, cut down a branch with one cluster of grapes, and bore it between them, upon a staff, to the children of Israel in the wilderness, showing them the fruit of the land, which they described as "a land flowing with milk and honey."*

*That cluster of grapes, seen through the glass of tradition, has been wonderfully magnified, both as to size and weight. Hyperbolisms are not surprising—should not be surprising—when we consider that they are not very rare in our own day, in the history of our own times even. Popular fancy is ever inclined to magnify; the more so in events of antiquity, events of a period when the printing press did not exist, and when there were no exact observers or critics; and what unbridled fancy has invented is carried as tradition from generation to generation, from one century to another until it is believed and repeated, even by men of science. Thus we find in "Wimer's Biblical Encyclopædia" (Germ., 3d edition, vol. II, p. 684) the following: *Stephen Schulz* who, about the middle of last century, traveled for several years through Europe, Asia and Africa, and published a work of 5 vols. concerning his travels, found on the southern Libanon a vine with clusters one ell long, weighing 12 pounds, whose berries were of the size of small plums. Forthwith "Kitto's English Cyclopedia of Biblical Knowledge (vol. III, p. 1071;) repeats the statements, referring them to the same source, Schulz and other travelers. Yet, in the simple biblical narrative, there is *not one word to justify such legendary exageration.* The incident took place at the time of the first ripe grapes (Numb. XIII, v. 20), and the messengers, having to carry the fruit over a very long journey, afoot, besides being burdened with pomegranates and figs, wisely resorted to this—then common—manner of transporting the grapes. That cluster of grapes was, doubtless, fine and large, especially compared with the small Egyptian grapes familiar to the Israelites; but there is *no* ground for believing them larger than those growing there at the present time. Had they been of such phenomenal size and weight as legendary writers claim and as some modern travelers pretend to have seen, so important a fact would have been mentioned by the men who carried them and whose report to the Israelites was intended to induce their people to at once go up and possess the good land. Reference to this land occurs quite frequently in the bible. It is there spoken of (Deutr. VIII, 7-9) as "a land of wheat and barley, and vines and fig trees and pomegranates; a land of olive oil and honey." And, in his last blessing, Moses speaks "of the precious fruits," but nowhere is their large size alluded to; nor do we believe that clusters of grapes weighing ten pounds each or more have ever been found anywhere. The immense vines raised and grown in England, lately also in California, under glass protection, are justly celebrated, and have produced annual crops of from 1,700 to 2,000 bunches; but these are not very large, averaging ¾ lbs. each. True, the art of gardeners has produced some single clusters of European grapes (Black Hamburgh, White Nice, Raisin of Calabria,) grown for exhibition, weighing from 20 to 25 lbs., but never has been found an *uncultivated* grape, in any part of the world, of which one single bunch weighed half as much.

The dim legendary outlines of Rome's ancient history show us that Numa Pompilius (670 B. C.), the successor of Romulus, ordered the use of pure wines at sacrificial ceremonies and prohibited the customary pouring of wine on the funeral pyre of the dead.

Alexander the Great found the wild vine in India's spicy forests; and the mountains of Firdistan in Persia probably supplied the vines which, cultivated more than a thousand years ago, produced the famous wine of Shiraz, still celebrated throughout the East.

Thus, from time immemmorial, the attention of all nations has been occupied with the cultivation of the vine wheresoever its fruit will ripen.

But whether the Grape-vine is a native of Asia, and has followed the footsteps of man from the shores of the Caspian Sea, and "intertwined its tendrils with civilization and refinement in every age," or whether the thousands of varieties that now exist spring from different primordial forms or species, certain it is that, although the Grape-vine may be found in Europe from the Tropic of Cancer to the Baltic Sea, and in America from the Gulf to the Lakes, the vine is nevertheless peculiarly the growth of definite climatic conditions; so much so that even in its most adapted climate there are often seasons if not of actual failure, at least of an imperfect development of its fruit. From long and careful observations of temperature and moisture, in years of success and failure, we have finally arrived at some definite conclusions respecting the meteorological influences affecting the grape.*

1st. No matter how excellent the soil, if there is a less average than fifty-five degrees, Fahr., of temperature for the *growing* months of April, May and June, and a less average than sixty-five degrees for the *maturing* months of July, August and September, there can be no hope of success; and where the temperature averages sixty-five degrees for the former months and seventy-five for the latter, other conditions being equal, fruit of the greatest excellence can be raised, and wine of the greatest body can be produced.†

2d. When there is an average rainfall of six inches for the months of April, May and June, and an average of 5 inches (126 mm.) for the months of July, August and September, though other conditions were favorable, we cannot succeed in raising grapes. When the average rainfall for the first months is not more than four inches, and the average for the latter is not more than three inches (75 mm.), other conditions favorable, the *hardy* varieties can be cultivated with success. But where there is less average rainfall than five inches for April, May and June, and a less average than two inches in July, August and September, all other conditions being favorable, fruit of the best quality can be raised, and wine of the greatest body and excellence can be made. The humidity of the atmosphere in some countries, the dryness of the air in others, will, of course, materially change the proportion of rainfall required for, or injurious to the grape. Here, a clear sky and dry atmosphere, high temperature and very little rainfall for the latter three months, and a less change of temperature than fifty degrees, Fahr., in twenty-four hours, any time of the year, are favorable conditions for success.

With regard to the necessity of attention to the most advantageous climatic conditions, says Mr. William Saunders (the eminent superintendent of the Experimental Gardens of the U. S. Department of Agriculture), "It is enough to remark, that where these are favorable, good crops of fruit are the rule, and that too, even in the absence of experience in cultivation; but in unfavorable locations the application of the highest attainments in the art and science of grape culture, so far as relates to pruning manipulations or culture and management of soil, will *not* insure success. Grape culture has now reached a point from which but little further progress can be made without a close recognition of the requirements of the plant, in connection with local climatic conditions, the most important being that of freedom from heavy dews (freedom from those cryptogamic diseases—mildew and rot). The topographical configuration of a locality is of far more importance than its geographical formation. Where the

*James S. Lippincott: Climatology of American Grapes.—*Id.* Geography of Plants—*U. S. Agr. Reports*, 1862 and 1863—Dr. J. Stayman: The Meteorological Influences affecting the Grape.

†In *both* hemispheres the profitable culture of the vine ceases within 30 degrees of the Equator, unless in very elevated situations, or in insular localities tempered by sea breeze. And in the old world, in Europe, it extends to about 50 degrees north.

Along the Thames, without the walls, the old Roman Vineyards still put forth green leaves and crude clusters, in the plains of East Smithfield, in the fields of St. Giles' and on the site where now stands Hatton Gardens. The question whether or not real vineyards were grown, or real wine made from them in England, has been a very vexed question among the antiquaries. But it is scarcely possible to read Peggs' dispute with Daines Barrington in the Archæologia without deciding both questions in the affirmative.—See Archæol., vol. III, p. 53. An engraving of the Saxon wine press is given in STRUTT'S Herda. Vineyards fell into disuse, either by treaty with France, or Gascony falling into the hands of the English. But vineyards were cultivated by private gentlemen as late as 1621. Our first wines from Bordeaux appear to have been imported about 1154, by the marriage of Henry II. with Eleanor of Aquitaine.—*From "Harold," the last of the Saxon Kings, by Sir Edward Bulwer Lytton, Bart. Vol. I, chapter IV.*

In the Southern hemisphere, the Cape of Good Hope just falls within the latitude occupied by the grape. In the North it extends to Lake Superior and parts of Southern Canada, Ottawa, Ontario. But where the winter cold is extreme, it is necessary not only to cover with earth, but also to provide for a liberal covering of snow by placing windbreaks of boards at intervals, or ever-green boughs to collect and hold the snow.

atmospheric conditions are favorable, satisfactory results may be obtained, even from poor soils, but in ungenial climates the very best soils will not guarantee success."

Moreover, with our present and increasing facilities of transportation, grape culture on a large scale cannot be remunerative, except in favorable localities which will produce the best quality almost every year with certainty. Where the production is low in quality and quantity, and often entirely fails, grape culture may exist on a small scale for home use and market, but on a large scale it will not reward the vintner's labor, and would finally be abandoned. As California in the West, so does Virginia in the East, and parts of Texas and Arkansas in the South, seem to possess the best localities for grape culture on a very large scale. But lately a locality has been found in the southwestern section of Missouri which promises to surpass most others east of the Rocky Mountains—uniting most advantageous atmospheric conditions (ozone), altitude and the proper soil—namely, the Ozark Mountains, which are no mountains, but mostly high rolling table lands, extending through the southern tiers of her counties to Northwest Arkansas, reaching an altitude of 1,500 feet; being above the heavy, muggy atmosphere prevailing over the great Mississippi basin, and thereby indicating a comparative freedom from rot and mildew, the great drawbacks of successful grape culture.

There are only a few countries where the grape will, in favorable seasons, grow to perfection, and there is no country in the world where *all* kinds of grapes would succeed. Species found in the lower latitudes will not flourish if removed further north; the natives of higher altitudes will not endure the southern heat; the Scuppernong cannot ripen north of Virginia; the Fox grape of the North will scarcely grow in the lower regions of Carolina and Georgia; a vine which produces delicious grapes in Missouri may become very inferior in the most favored localities of New Hampshire.

Thus the climate, the mean temperature as well as the extremes, the length of the growing season, the relative amount of rain, the ameliorating influence of lakes and large rivers, the altitude as well as the soil, have an almost incredible influence on various varieties of grapes; and a judicious choice of locations adapted to the grape, and of varieties adapted to our location, its climate and soil, is therefore of the first importance.

"No one grape is suited to all localities; neither is there any one locality which is suited to all grapes; and we must not expect that any one variety will be found possessing the most desirable qualities that will be suited to all localities."—*G. W. Campbell.*

Wm. Saunders, Superintendent of U. S. Experimental Gardens at Washington, D. C., says: "Our native grapes are destroyed by winter frosts because they have been subjected to mildew in summer, and it is only in special localities that all kinds grow well. The most generally cultivated grapes are confessedly not those of the best quality either for table or for wine."

"The best grape climates are those where there are least dews, and wherever we find specially favored localities, we will find this partial or total exemption from heavy dews. This has long ago been demonstrated, and new grapes emanating from favored regions will fail to give entire satisfaction when grown in localities less favorably situated, and thus lead to disappointment. This is the reason for so many seemingly conflicting opinions regarding the merits of varieties, and it is unfortunate that these considerations are not better understood and recognized. When a young grape-vine loses its foliage by midsummer, and the green shoots remain unmatured till frost, that variety might as well be discarded at once; no known method of pruning, fertilizing or care in cultivation will help it."

C. L. Watrous, of Des Moines, Iowa, wrote in an excellent paper on "Testing New Fruits:" No one can safely commend a new fruit for general cultivation in any region until it has been well tested there under all usual conditions, nor until after thorough trial, for a period equal to the usual life of an individual of that species.

But because a vine does not succeed in one place, it is no reason that it may not be of the greatest value in another which is suited to its character.

Notwithstanding that over 1500 varieties are cultivated in Europe, yet the number of kinds especially adapted to the different localities is very limited for each of them, and we seldom find more than three or four varieties to form the main bulk of the vineyards of the different sections; each province, county or township even, having its own special favorites. This question of adaptability to soil and local climate is one of the greatest importance, and should be closely studied by the intelligent grape grower if he would make its culture a success. No existing variety, and probably none that will ever be produced, is well adapted to general cultivation in more than a limited portion of this vast country. This limitation is not determined by isothermal lines. Success or failure of a variety depends not only on degrees of heat and cold;

not only on earliness or lateness of seasons, however important factors these may also be, but on numerous causes, some of which we cannot, so far, sufficiently understand and explain. We need but remember that the grapes we cultivate in the United States have originated from one or the other of several distinct species, or from crosses between some of their varieties, and that each of those native species is found growing wild in certain limited portions of our country, and not at all in others. Thus the *wild* Labrusca is a stranger to the lower Mississippi Valley and westward. By observing what species grows in a locality, we may safely assume that cultivated varieties of the same species will thrive best in that locality or its vicinity under otherwise proper conditions. Where the native species does *not* exist, its cultivated varieties may for a time promise excellent success; but in many localities this promise will probably, sooner or later, end in disappointment. This has been our sad experience even with the *Concord*, which is generally considered the most reliable, healthy and hardy American grape.

On the other hand this proposition seems to conflict with the fact that American vines of different species have been successfully transplanted even to *Europe*. But it would be a great mistake to believe that they would succeed in all parts of that continent. It was found, on the contrary, that there also some of our varieties which succeed well in one portion of France, for instance, entirely failed in others; and this only proves that we may find in far-off foreign lands localities which exactly correspond in soil, climate, etc., with certain localities in our own country, and where this is the case, well and good; but where these are different the results are unsatisfactory. In evidence we quote from the report of the commission, composed of some of the best French authorities, to the International Phylloxera Congress, in Bordeaux, (Oct., 1882). After giving a detailed report of their observations in the principal vineyards of France where American vines have been planted, they say, "But they (these resisting American vines) do by no means succeed equally well in all locations. The nature of the terrain and the climate must be taken into serious consideration. But was it not one of the great difficulties with the French vines to know which variety suited such or such soil or aspect? How many failures were the consequence of bad selection! It is, of course, the same with American vines, coming from widely different conditions of temperature, humidity and altitude."

Unfortunately, this has been and is even now but insufficiently understood.

Indigenous wild grapes were found at the discovery of this new world; the legend tells us that when the Norsemen first discovered this country, "Ileif Erickson" called the land *Vineland*. As early as 1564 wine was made by the first colonists in Florida from the native grape. The Pilgrim fathers saw vines in abundance at Plymouth. "Here are grapes, white and red, and very sweet and strong also." wrote Jos. Edward Winslow in 1621. Rev. Fr. Higginson, writing in 1629 from the Massachusetts Colony says "Excellent vines are here, up and down in the woods. Our governor has already planted a vineyard, with great hope of increase." Thus, during the previous centuries grapes were cultivated, and wine has occasionally been made in America from native grapes; (the French settlers near Kaskaskia, Ills., made, in 1769, one hundred and ten hogsheads of strong wine from wild grapes)—"but neither the quality of the wine nor the price obtained for it offered sufficient inducement to persevere."—*Buchanan.*

The European grape, *Vitis Vinifera*, was, therefore, considered *the only true wine grape.*

In 1630, a London company sent French vignerons into the Virginia Colony to plant grapevines which they had imported for the purpose; the poor vignerons were unjustly blamed for their failure. In 1633 Wm. Penn vainly tried to introduce and cultivate European varieties in Pennsylvania. In 1790 a Swiss Colony, grape growers from Lake Geneva, tried to raise grapes and make wine in Jessamine County, Kentucky, but their hopes were soon frustrated; their labor and fund—$10,000, a large amount in those days—were lost; and only when they commenced to cultivate an indigenous grape, which, however, they supposed to be from the Cape (see description of *Alexander*), they had somewhat better success. About twenty years later (1820) the *Catawba* and *Isabella* were introduced, (see description). These two varieties may be considered the principal pioneers of American grape culture; but though excellent and successful at that time in many localities and praised by song, they did not satisfy those who were acquainted with the superior quality of the European grape and did not fully meet the demands of refined taste, neither for the table (market) nor for wine, (our native wines were specially decried by importers), and the production of *new* grapes by forced crossing and hybridization was scarcely known. Our most esteemed veteran, Geo. W. Campbell of Ohio, can remember when no grapes were known in the lake region of Ohio but the wild Fox and the Frost grapes

of the forest; hence the introduction and planting of foreign grapes and their seedlings was still looked for. The attempts with German, French and Spanish vines, made again and again, proved failures. Hundreds of thousands (comprising many different sorts) of the best European vines were imported, but they all perished "from the vicissitudes of the climate." Thousands of failures are recorded; not one of durable success; and Downing was fully justified in saying (*Horticulturist*, Jan., 1851), "The introduction of the foreign grape into this country for open vineyard culture is *impossible*. Thousands of individuals have tried it—the result in every case has been the same—a season or two of promise, then utter failure."*

While this fact could not be denied, the cause remained a mystery. All pronounced the European grape as "unsuited to our soil and climate;" all attributed its failure to that cause. But we, and doubtless many others with us, could not help thinking that "soil and climate" cannot be the sole causes; for this vast country of ours possesses a great many locations where soil and climate are quite similar to those of some parts of Europe where the Vinifera flourishes. Is it reasonable to suppose then, that none of the many varieties which are grown in Europe under such varied climatic conditions, from Mainz to Naples, from the Danube to the Rhone, should find a congenial spot in these United States, embracing almost every climate of the temperate zone? If soil and climate were so unsuited, how is it that the young, tender European vines grow so well, so promising of success, for a few seasons; in large cities sometimes even for several years? How explain the fact that the finest European varieties of other fruits, the pear for instance, are successfully grown here in some localities, and that, but for the curculio, the Reine Claude and German Prunes would flourish here as well as there? Slight differences of soil and climate might well produce marked differences in the constitution of the vine, perhaps also somewhat change the flavor and quality of the grapes, but could not sufficiently account for their absolute failure. Nevertheless most of our learned horticulturists looked then for no other cause; they even went so far as to teach that "if we really wished to *acclimate* the foreign grape here, we must go to the seeds, and raise two or three new generations in the American soil and climate." In obedience to these teachings, numerous fruitless attempts have been made here to raise seedlings of the European grape that will *endure our climate*. Like their parents they seemed successful for a time*—to be soon discarded and forgotten. But, in absence of any satisfactory reason for these failures, it is quite natural that renewed attempts were and are continually made.† In the spring of 1867, we ourselves imported from Austria about 300 rooted vines (Veltliner, Blue Baden, Riesling, Tokay, Uva Pana, &c.), not with expectations of success in open air culture, but with a view to discover, by careful observation, the real cause of failure, and knowing the true cause, to be then, perhaps, able to obviate it. The vines grew splendidly, but during the summer of 1869, though bearing some beautiful fruit, their foliage began to wear a yellow, sickly appearance. In 1870 many were dying and we almost despaired of discovering the cause, when Prof. C. V. Riley, then our State Entomologist, informed us that the discovery had just been made in France by Planchon and Lichtenstein, that the serious grape disease which had attacked their noble vineyards was caused by a root-louse (Phylloxera), which bears a close resemblance to our American grapeleaf-

* Always excepting California, which was then almost unknown, but which is now the greatest wine-producing State of this country. There, from the counties bordering the Bay of San Francisco down to Colorado River, several hundred varieties of the best European grapes are successfully cultivated; and even since the appearance of the Phylloxera, evidently introduced from Europe on imported vines, American grapes are not in demand there, except for the purpose of grafting thereon European varieties. Recently the *Soudan grape*, a vine discovered on the banks of the Niger in Africa, has been introduced into California. This peculiar vine is an *annual*, but has a tuberous perennial root. The seeds are much like those of other grapes; the leaves resemble some Rotundifolia varieties of the S. A. S.

This Soudan grape belongs to a genus quite distinct from the true Vitis. Species of that kind were disseminated in the tropic regions of Asia, Africa (in New Holland) and even in Mexico; but their fruit is without value. Besides their culture is quite impossible in the temperate zone

* Among the seedlings of foreign grapes raised in the U. S., which obtained a name and fame, are: BRINKLE and EMILY, raised by Peter Raabe of Philadelphia; BRANDYWINE, originated near Wilmington, Del.; *Katarka* and MONTGOMERY, or Merritt's Seedling, raised by Dr. W. A. Royce of Newburg, N. Y. To these belong also CLARA and WEEHAWKEN, (see description). N. Grein of Hermann, Mo., introduced, about twenty years ago, some very good new grapes, which he claimed (and honestly believed) to have raised from seed of the German Riesling. They proved to be *not* seedlings of the European Riesling at all, but of the American *Taylor* grape, and are now known as Missouri Riesling, Grein's Golden, &c., (see these varieties). George Haskell, a most persevering experimenter, says: "I raised many hundred vines from seeds of different foreign grapes. These seeds were planted under glass, and the vines remained in the house two years, when they were removed to the open air. None of them proved healthy * * * they all died in a few years, though well covered in winter.

† The only satisfactory method of obtaining the fine *foreign grapes* in this country, east of the Rocky Mountains, is under glass, by the use of the grapery. This, however, so far, is done on a very limit d scale only, as a luxury for the table; and even there the roots of the vines in the outside border are exposed to the danger of being infested by the Phylloxera; so that vines grafted on American roots should be used. Those who desire and can afford to enjoy this luxury we refer for information to Peter Henderson's excellent books on gardening.

All our remarks on grape culture refer only to the States east of the Rocky Mountains, unless otherwise expressly stated.

gall-louse, an insect long known here. In 1871 and since, Prof. Riley often visited our vineyards, as we gave him full permission and cheerfully assisted him to unearth both diseased and healthy vines, native and foreign, of every kind, in order to examine their roots and to study the question. By his observations and those of Prof. Planchon, made by both in this country as well as in France, and afterwards confirmed and verified by all prominent naturalists, the identity of the American insect with the one discovered in France, and of the two types, the gall and the root-lice, has been substantiated. Thus, the principal cause of the absolute failure of European vines in this country has been discovered, but no satisfactory remedy has been found. So far, it seems impossible to destroy or to guard against this insect enemy; while the vigorous roots of our American vines enjoy a relative immunity from its injuries, the pest thrives on the tender roots of the European vines, which readily succumb.

The French Commission, in its report to the Viticultural Congress, held at Montpellier, Oct., 1874, came to the conclusion that "In presence of the non-success obtained from all attempts made since 1868, with a view to preserve or cure our vines, and feeling that after six years of efforts in this direction, no process except submersion* has been found effective, many persons are quite discouraged, and see in the American vines, whether justly so or not, the *only* plank of safety." Since that time, wheresoever the most careful, practical grape-growers and most scientific naturalists met and exchanged their views, as at the International Congress held at Lyons, France, and at Saragossa, Spain, in 1880; at Bordeaux in 1881, the leading principle established has been: "that the Phylloxera cannot be exterminated where it once infests the vineyards, nor can its introduction be prevented by any precautionary measures; but that there are some means whereby, in spite of the insect, we may yet save our vineyards from destruction, and enjoy their richly paying returns; and that the most practical, the simplest, cheapest and surest means is by planting the resisting American grapes." Already millions of American grape-vines are growing in France, hundreds of thousands in Spain, Italy, Hungary, etc. California also imported many cuttings of Riparia Vines to graft thereon their European (Vinifera) sorts which succeed there on our Phylloxera-resisting stock. In Feb., 1894, Senator Fair purchased from us half a million of such cuttings for his new 1000-acre vineyards near Lakeville, Cal. How much more, then, must WE look to species which we find indigenous here, and to their descendants, for success in grape culture.*

A knowledge of the distinctive permanent characters of our species, and a proper classification of our varieties, referable to them, is of far more importance than is generally supposed.† Thirty-five years ago Robert Buchanan wrote in his book on the culture of the grape: "The perfection of a definite arrangement of all our varieties must remain for future labors, but it is to be hoped an end so desirable will not be lost sight of."

And while many grape-growers may skip over the following pages as useless, we hope that *some* of them will thank us for embodying in this catalogue the valuable treatise on *The True Grape-Vines of the United States* by the late *Dr. Engelmann*, and the "Classification of the Wild Grapes of North America," by Prof. T. V. Munson.

*Some insecticides are now believed to be of service, if correctly applied and under certain favorable conditions, in prolonging the life of vines which are infested by the Phylloxera.

*While our Horticulturists zealously work with confident hopes to produce, from our indigenous species and their hybrids, varieties which will equal those of Europe, it is meet that we do not ignore the views of foreign Viticulturists who visit this country with the special purpose to study this question and examine the American grape. We translate from "Une Mission Viticole en Amerique" par Pierre Viala, Professor of Viticulture, Montpellier, France, 1889: "The reputation acquired by certain new American vines was the unfortunate cause of their introduction in France. On my return from the United States I was convinced that we have to count on American grafting stock, bearing our (European) varieties, for the reconstruction of our vineyards and the preservation of the legitimate reputation to the French wines. This impression which I brought with me from the United States, and formed since in France, has verified my opinion more and more that *no* American vine is susceptible of giving us products equalling in quantity and quality our indigenous (European) vines. The most meritorious direct American producers are abandoned (discarded); the maintenance of their culture in the United States is caused by the action of the mildew and Black Rot which destroys the fruit of *European vines.* It may be that the lately discovered efficacious treatment of these diseases will determine the Americans of the South to constitute their vineyards, on Phylloxera resisting stocks, with our (European) vines."—This view may be inspired by patriotic pride of the French Viticulturist; but it is still worthy of attention.

†Even A. S. Fuller, in his excellent Treatise on Grape Culture, written in 1866, said: "Practically it is of little consequence what view is taken of these unusual forms (of distinct species, or marked varieties of the species), as the cultivator is interested in them only as varieties, and it is of no particular moment to him whether we have one hundred or only one native species." We are satisfied that he considers it of far more consequence now.

CLASSIFICATION.

The True* Grape-vines of the United States.

BY DR. G. ENGELMANN.

[This paper is an elaboration of his Synopses of American Grape-vines, which appeared in Riley's Fourth Report of the State Entomologist of Missouri, 1872, the American Naturalist, 1872, VI. pp. 539-542, Riley's Sixth Report 1874, pp. 70-76, and the second edition of the Bushberg Catalogue, 1875, pp. 4-11. The French Translation of same by Bazille and Planchon (Paris and Montpellier, 1876)—It has been entirely rewritten, adding many illustrations, etc., by Dr. G. Engelmann himself for the third edition of the Bushberg Catalogue, 1883. This was his last work. He died on the 4th of Feb., 1884. It was reprinted in the "Botanical Works of the late Geo. Engelman, edited by Wm. Trelease and Asa Gray, Cambridge, Mass., 1887.]

The Grape-vines are among the most variable plants, even in their wild state, in which climate, soil, shade, humidity and perhaps natural hybridization, have originated such a multiplicity and such an intermixture of forms, that it is often difficult to recognize the original types and to refer the different given forms to their proper alliances. Only by carefully studying a large number of forms from all parts of the country, in their peculiar mode of growth and especially their fructification, or rather their seeds, are we enabled to arrive at any thing like a satisfactory disposition of these plants.

(Table of Grape Seeds: Figs. 1-33, page 11.)

Before I proceed to the classification of our Grape-vines, I deem it necessary to make a few *preliminary remarks:*

The grape-vines cultivated in that part of the United States lying east of the Rocky Mountains are all natives of the country, most of them picked up in the woods; some, perhaps, improved by cultivation; and a few the product of natural or artificial hybridization. In that part of the country the wine grapes of the Old World can only be cultivated under glass; but in New Mexico and California they have been successfully introduced by the Spaniards, and in the latter State a great many varieties are now extensively cultivated, and promise to make one of the great staples of that region; but eastward and northward they have entirely failed, owing to the destructive effects of that now so well known and dreaded insect, the Phylloxera, of which more, further on.

* We treat here only of the *true* grape-vines, with edible berries. In the flowers of these the small green petals do not expand, but cohere at the top, and separating from their base, fall away together as a little five-lobed hood. The flowers, and consequently the fruit, are arranged in the well-known clusters (thyrsus). Thus they are distinguished from the *false* grape-vines (botanically known as *Ampelopsis* and *Cissus*), which often resemble the true grape-vines very much, but bear no edible berries. Their flowers expand regularly, opening at top, and are arranged in broad, flat-topped clusters (corymbs).

All the true grape-vines bear fertile flowers on the stock, and sterile flowers on another separate stock, and are, therefore, called *polygamous*, or, not quite correctly, *diœcious*. The sterile plants do bear male flowers with abortive pistils, so that while they never produce fruit themselves, they may assist in fertilizing the others; the fertile flowers however, are hermaphrodites, containing both organs—stamens and pistils—and are capable of ripening fruit without the assistance of the male plants.* Real female flowers, without any stamens, do not seem ever to have been observed. Both forms, the male and hermaphrodite, or if preferred, those with sterile and those with complete flowers, are found mixed in their native localities of the wild plants, but of course, only the fertile plants have been selected for cultivation, and thus it happens that to the cultivator only these are known; and as the grape-vine of the Old World has been in cultivation for thousands of years, it has resulted that this hermaphrodite character of its flowers has been mistaken for a botanical peculiarity, by which it was to be distinguished, not only from our American grape-vines, but also from

* These fertile plants, however, are of two kinds: some are *perfect hermaphrodites*, with long and straight stamens around the pistil; the others bear smaller stamens, shorter than the pistil, which soon bend downward and curve under it; these may be called *imperfect hermaphrodites*, approaching females, and they do not seem to be as fruitful as the perfect hermaphrodites, unless otherwise fertilized.

In the following illustrations of the

VARIOUS FORMS OF GRAPE FLOWERS

are shown the different forms of grape blossom, life size and enlarged:

(Original drawing by *T. V. Munson.*)

Fig. 38. Fig. 39. Fig. 40.

Fig. 38.—Perfect Hermaphrodite, self-fertilizing, with long, erect stamen (filament) and anthers.

Fig. 39.—Imperfect Hermaphrodite or Pistilate, not self-fertilizing, with smaller, shorter stamens, the filament becoming recurved.

Fig. 40.—Male or Staminate, Non Pistilate, with larger pollen bearing anthers, Pistil, none.

It is proper here, to insist on the fact that nature has not produced the male plants without a definite object: and this object, without any doubt, is found in the more perfect fertilization of the hermaphrodite flowers, as it is a well established fact that such cross fertilization produces more abundant and healthier fruit. Vine growers might take a hint from these observations, and plant a few male stocks in their vineyards, say 1 to 40 or 50 of their fertile stocks, and might expect from such a course healthier fruit, which would probably resist rot and other diseases better than fruit grown in the ordinary way. I would expect such beneficial influence especially in all varieties that have short stamens, such as the Taylor. Male stocks can be easily obtained, either in the woods or from seeds. It is of course understood that the males ought to belong to the same species (or better, to the same variety) as the fertile plants to be benefitted by their pollen. European vine growers may also profit by this suggestion.

the wild grapes of the Old World. But plants raised from the seeds of this, as well as of any other true grape-vine, generally furnish as many sterile as fertile specimens, while those propagated by layering or by cuttings, of course, only continue the individual character of the mother-plant or stock.*

The peculiar disposition of the tendrils in the grape-vines furnishes an important characteristic for the distinction of one of our most commonly cultivated species, *Vitis Labrusca*, its wild and its cultivated varieties, from all others. In this species—and it is the only true *Vitis* exhibiting it—the tendrils (or their equivalent, an inflorescence), are found opposite *each* leaf, and this arrangement I designate as *continuous tendrils*. All the other species known to me exhibit a regular alternation of two leaves, each having a tendril opposite it, with a third leaf without such a tendril, and this arrangement may be named *intermittent tendrils*. Like all vegetable characters, this is not an absolute one; to observe it well it is necessary to examine well-grown canes, and neither sprouts of extraordinary vigor, nor stunted autumnal branchlets. The few lowest leaves of a cane have no opposite tendrils, but after the second or third leaf the regularity in the arrangement of the tendrils, as above described, rarely fails to occur. In weak branches we sometimes find tendrils irregularly placed opposite leaves, or sometimes none at all.

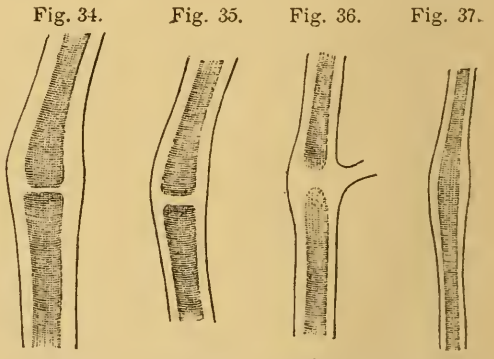
It is a remarkable fact connected with this law of vegetation, that most grape-vines bear only two inflorescences (consequently two bunches of grapes) upon the same cane, while in the forms belonging to *Labrusca* there are often three, and sometimes, in vigorous shoots, four or five, or rarely, even more in succession, each opposite a leaf. Whenever in other species, in rare cases, a third or fourth inflorescence occurs, there will always be found a barren leaf (without an opposite inflorescence) between the second and third bunches.

Another valuable character, discovered by Prof. Millardet, of Bordeaux, is found in the structure of the branches ("canes," as they are usually called). These contain a large pith, and this pith is transversely separated at each node (point where a leaf is or has been inserted), by what is called a diaphragm. These diaphragms consist of harder, solid pith, of the appearance of wood, and are examined best in canes 6 to 12 months old, when the pith has turned brown and the diaphragm is whitish; a longitudinal section through the cane will best exhibit them. They are, in most species, 1 to 2 lines thick; but in the Riverbank grape, *Vitis Riparia*, the diaphragm is not more than $\frac{1}{8}$ to $\frac{1}{4}$ line thick; and in the Sand, or Rock grape, *Vitis Rupestris*, it is very little thicker. For us here, the distinction of these species is of no great practical importance; but, as a considerable demand for them has sprung up in Europe, it is well to characterize them accurately; and this character holds good in winter, when all others of foliage or fruit have disappeared. There is only one American grape-vine, also in other respects an aberrant from, the Southern Muscadine grape, *Vitis Vulpina*, which is entirely destitute of such diaphragms.

The cut represents the diaphragms of different species. Fig. 34, *Vitis Riparia*, with the thinnest, and fig. 36, *Vitis Cordifolia*, with a thick diaphragm; *Vitis Æstivalis*, is similar to this last, and *Vitis Labrusca*, scarcely thinner; but fig. 35, *Vitis Rupestris*, has a diaphragm not much thicker than the first. Fig. 37 shows *Vitis Vulpina* (or *V. Rotundifolia*) without any partition.

It is well known that some species of *Vitis* grow well from cuttings, while others are difficult to propagate in this way.

Easy to propagate are *Labrusca*, *Monticola*, *Riparia*, *Rupestris* and *Palmata*. Almost



impossible to propagate by cuttings are *Candicans*, *Æstivalis*, *Cinerea*, *Cordifolia*, *Vulpina*, and probably *Californica*. *Arizonica* and *Caribea* I do not know in this respect. That the southern cultivated forms of *Æstivalis* grow more or less readily from cuttings is stated further on (page 14).

The structure of the bark of the young canes shows also differences in the different species, but as the characters are to some extent of microscopical detail they are here

* Some observations (rather loose, to be sure) seem to point to the possibility of the sexual characters of the grape-vines becoming changed under certain circumstances; and, though I have not seen a case of this kind myself, nor heard of an instance where fertile vines in cultivation began to bear sterile (male) flowers, there is no absolute impossibility in it, as we know that other plants (willows for example) occasionally sport in this manner.

omitted. The bark of the mature canes is ashy gray (*V. Cordifolia*, *V. Cinerea*), to red or brownish (*V. Æstivalis*); it peels off after the first season in large flakes, or in narrow strips or shreads; only in the Muscadine grape the dark gray bark does not peel off at all, at least not for a number of years.

Young seedlings of all the grape-vines are glabrous or only very slightly hairy. The cobwebby or cottony down, so characteristic of some species, makes its appearance only in the more advanced plants; in some of their varieties, and not rarely in the cultivated ones, it is mainly observed in the young growth of spring and is apt to disappear in the mature leaf; but even then such leaves are never shining as they are in the glabrous species, but have a dull or unpolished, or even wrinkled surface.

The form of the leaves is extremely variable, and descriptions must necessarily remain vague. They are usually cordate at base, either with an acute and narrow sinus (*V. Cordata*, and many other species), or with a broad and wide one (*V. Riparia* and *V. Rupestris*). Leaves of seedling plants are all entire, i. e, not lobed; young shoots from the base of old stems, as a rule, have deeply and variously lobed leaves, even where the mature plant shows no such disposition. Some species (*V. Riparia*), or some forms of other species (forms of *V. Labrusca* and *V. Æstivalis*), have all the leaves more or less lobed, while others exhibit, on the mature plant, always entire, or, I should rather say, *not lobed* leaves; the leaves of *V. Rupestris* and *V. Vulpina* are never lobed. Only the leaves of flower-bearing canes ought to be considered as the normal ones.

The surface of the leaves is glossy and shining, and mostly bright green, or in *Rupestris* pale green; or it is dull above and more or less glaucous below. The glossy leaves are perfectly glabrous, or they often bear, especially on the nerves of the lower side, a pubescence of short hair. The dull leaves are cottony or cobwebby, downy on both or only on the under side, and this down usually extends to the young branches and to the peduncles, but, as has been stated above, often disappears later in the season.

On both sides of the insertion of the petiole or leafstalk into the branchlet, we find on very young, just developing shoots, small accessory organs, which soon disappear; they are the stipules. In most species they are thin, membranaceous, rounded, at the top somewhat oblique, smooth in some, downy or woolly in other species. They are most conspicuous and elongated in *Vitis Riparia*, in which I find them 2½-3 lines long; in *V. Rupestris* they are 1½-2½ lines in length; in *V. Candicans* and *Californica* scarcely shorter, in *V. Labrusca* 1½-2 lines long; in *V. Æstivalis*, *Cordifolia*, and most others, they are only one line long or less; in very vigorous young shoots they may sometimes be larger, just as their leaves are also larger than the normal.

Not much of a distinctive character can be made out of the flowers. It is observed, however, that in some forms the stamens are not longer than the pistil, and very soon bend under it, while in other forms they are much longer than the pistil, and remain straight till they fall off. It is possible that those with short stamens are less fertile than the others.*

The time of flowering is quite characteristic of our native species, and it seems that the cultivated varieties retain herein the qualities of their native ancestors. The different forms of *Riparia* flower first of all; soon afterwards comes *Rupestris*, next *Labrusca* and its relatives, and later *Æstivalis* comes in bloom. One of the last flowering species is *Cordifolia*, and still later, *Cinerea*. *Vinifera* seems to flower soon after *Labrusca*, but it is not cultivated here, nor is *Vulpina* (*Rotundifolia*), which is probably the latest of all. *V. Candicans* apparently blooms about the same time that *Labrusca* does.

Riparia begins to open its flowers about St. Louis three to five weeks earlier than the first blossoms of *Æstivalis* are seen in the same locality. In favorable situations and in early seasons they make their appearance in this vicinity as early as April 25th, at other seasons sometimes as late as May 15th, or even 20th, on the average about May 10th, and generally about the time when the Acacias (Black Locusts) bloom, both filling the atmosphere with the sweetest perfumes. *Cordifolia*, and, after this, *Cinerea*, on the contrary, bloom from the last days in May to (in late seasons) the middle of June, when that weed among trees, the fetid Ailantus (misnamed the tree of Heaven), exhales its nauseous odors and the beautiful Catalpa expands its gorgeous bunches of flowers. *V. Palmata* (Vahl), of which we do not yet know much, seems to be the latest flowering Grape-vine with us, flowering even after *Cinerea*. Thus we are not likely to have any Grape-vines in flower *here* before April 25th or after June 20th.

One of the botanical characters of the Grape-vine is found in the *seeds*. The bunches may be larger or smaller, looser or more compact, branched (shouldered) or more simple, conditions which, to a great extent, depend on variety, soil and exposure;

* Compare note on page 7 with illustration of flowers, Fig. 38-40.

the berries may be larger or smaller, of different color and consistency, and contain fewer or more seeds (never more than four), but the seeds, though to some extent variable, especially on account of their number* and mutual pressure, where more than one is present, exhibit some reliable differences. The big top of the seed is convex or rounded, or it is more or less deeply notched. The thin lower end of the seed, the beak, is short and abrupt, or it is more or less elongated. On the inner (ventral) side are two shallow, longitudinal irregular depressions. Between them is a ridge, slight where there are one or two seeds, or sharper where the seeds are in threes or fours; along this ridge the *raphe* (the attached funiculus or cord) runs from the *hilum*, at the beak, over the top of the seed, and ends on its back in an elongated, oval or circular well-marked spot, called by botanists *chalaza*. This raphe is on that ridge represented by a slender thread, which on the top and back of the seed is entirely indistinct, or scarcely perceptible, or it is more or less prominent, like a thread or a cord. In our American species these characters seem pretty reliable, but in the varieties of the Old World Grape-vine (*Vinifera*), several thousands of years removed from their native sources, the form of the seed has also undergone important modifications, and can no longer be considered so safe a guide as in our species.

But different as these seeds are among themselves they have a character in common, which distinguishes them from all our American Grape seeds; their beak is narrower and usually longer, and their large chalaza (the area on the back of the seed) occupies the upper half and not the centre of the seed; in the American species the beak is shorter and more abrupt; the chalaza, usually smaller, and often not circular, but narrower, is placed in the centre of the back. Any one who wishes to satisfy himself of this need only compare a raisin seed with any of our grape seeds, if the following cuts are not plain enough.

The size and weight of the seeds vary greatly in the different species; thus *Labrusca* and *Candicans* have the largest, *Cinerea* and *Riparia* the smallest seeds; but even in the wild state we find variation, e. g., in *Æstivalis*, still more in *Cordifolia*, and most in *Riparia*. In *Vinifera*, the European grape, however, the variations are much greater, greater even sometimes than our figures show. Some have laid stress on the color of the seeds, which varies between brown and yellowish, but that seems to me to go too far for our purposes.

The cuts of 33 Grape seeds, here represented, illustrate the different characters which have been mentioned above. The figures are magnified four times (four diameters), accompanied by an outline of natural size. They all represent the back of the seed.

Figs. 1 and 2, *Vitis Labrusca*, seeds of wild plants; Fig. 1 from the District of Columbia, and Fig. 2 from the mountains of East Tennessee. The seeds of the cultivated varieties do not differ from these; they are all large, notched on top; chalaza generally depressed and no raphe is visible in the groove which extends from the chalaza to the notch.

Figs. 3 to 5 represent seeds of cultivated forms, which all show evident signs of hybridity and acknowledge the parentage of *Labrusca* by the form and size of the seed as well as by the irregular arrangement of the tendrils. Fig. 3 is the seed of the Taylor Grape, which stands near *Riparia*. Fig. 4 is the seed of the *Clinton*, which has, perhaps, the same parents. Fig. 5, seed of the *Delaware* Grape, which possibly may be a hybrid of *Labrusca* with *Vinifera*.

Figs. 6 to 8, *Vitis Candicans;* seed similar to those of *Labrusca*, but broader, generally with a shorter beak, and less distinctly notched. Figs. 6 and 7 are from Texas, the latter broader and with a broader beak; Fig. 8 comes from South Florida, and is still broader and shorter.

Fig. 9, *Vitis Caribæa*, similar to the last, but smaller; seeds short and thick, and deeply notched.

Figr. 10 and 11, *Vitis Californica*, seeds often smaller, scarcely or not at all notched, raphe indistinct or quite invisible; chalaza narrow and long. Fig. 10 represents a single seed (one only in a berry) from near San Francisco; Fig. 11 is one of four seeds from San Bernardino, in Southern California.

Fig. 12, *Vitis Monticola;* seed very similar to those of the last species, thick, notched, without a distinct raphe, and with a long and narrow chalaza.

Figs. 13 and 14, *Vitis Arizonica*, from the Santa Rita Mountains; seeds small, slightly notched, with a more or less distinct but flat raphe.

Figs. 15 to 17, *Vitis Æstivalis;* seeds rather larger, cord-like raphe and more or less circular chalaza strongly developed; all the seeds are from wild grapes gathered about St. Louis; the seeds of the cultivated forms, Northern and Southern, are similar. Figs. 15 and 16 are from berries with only one or two seeds; Fig. 17 is narrower, and from a larger four-seeded berry.

Fig. 18, *Vitis Cinerea*, a seed similar to the last, with the same strong raphe, but smaller in size, and often single.

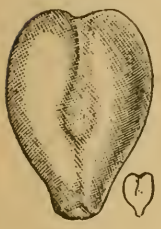
Figs. 19 and 20, *Vitis Cordifolia;* seeds also similar to the two last, but raphe not quite so prominent, mostly single or in twos, rarely more in a berry; Fig. 19 comes from a larger berry, with more seeds, found near St. Louis; Fig. 20 is a single seed, from the District of Columbia.

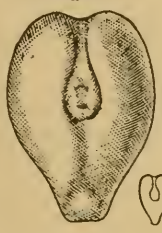
Fig. 21, *Vitis Palmata;* seed large, almost globose, with a very short beak, a narrow chalaza, no raphe visible, top slightly depressed.

Figs. 22 to 25, *Vitis Riparia;* seeds similar to the last, but smaller, though quite variable in size.

*A single seed is always thicker, plumper, more rounded; two seeds are flattened on the inner, rounded on the outer side; three or more seeds are more slender and angular; these different variations may often be found in berries of the same bunch.

V. LABRUSCA. Fig. 1. Fig. 2.





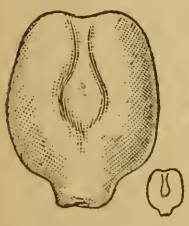
TAYLOR. Fig. 3.

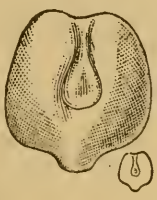
CLINTON. Fig. 4.

DELAWARE. Fig. 5.

V. CANDICANS. Fig. 6.

V. CANDICANS. Fig. 7. Fig. 8.





V. CARIBEA. Fig. 9.

V. CALIFORNICA. Fig. 10.

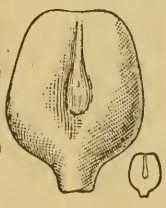
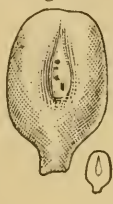
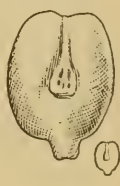


Fig. 11.



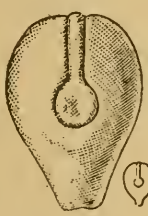
V. MONTICOLA. Fig. 12.

V. ARIZONICA. Fig. 13.



V. ARIZONICA. Fig. 14.

Fig. 15.



V. ÆSTIVALIS. Fig. 16.

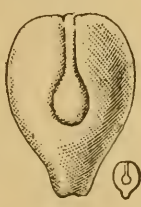
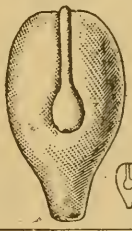
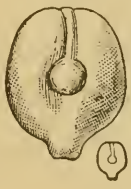


Fig. 17.



CINEREA. Fig. 18.



V. CORDIFOLIA. Fig. 19.

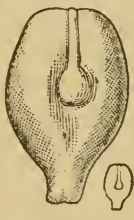
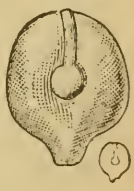


Fig. 20.



V. PALMATA. Fig. 21.

V. RIPARIA. Fig. 22.

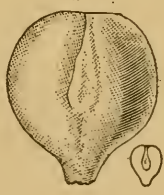


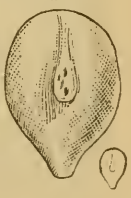
Fig. 23.

V. RIPARIA. Fig. 24.

Fig. 25.

V. RUPESTRIS. Fig. 26.

Fig. 27.



V. VINIFERA.

Fig. 28, Mummy Grape.

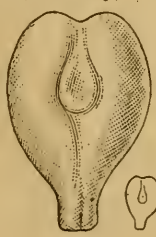
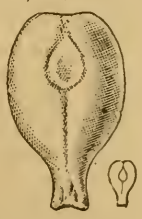


Fig. 29, Brusca.



VITIS VINIFERA.

Fig. 30, Riesling.

Fig. 31, Chasselas.

Fig. 32, Bl. Hamb'g.

V. VULPINA. Fig. 33.

The seeds all come from wild plants: Figs. 22 and 23, from Goat Island on the Niagara Falls; Fig. 22 a single broad seed; Fig. 23 from a three-seeded berry; Fig. 24 from a two-seeded berry from the shores of Lake Champlain, in Vermont; Fig. 25, seed of the June grape from the banks of the Mississippi below St. Louis. The seeds are obtuse, or very slightly depressed on top, chalaza rather flat, elongated and gradually lost in a groove which encloses the scarcely prominent raphe.

Figs. 26 and 27, *Vitis Rupestris;* Fig. 26 from a two-seeded berry from Texas, and Fig. 27 from a four-seeded one from Missouri. The top of the seed is obtuse, not notched, and the raphe very inconspicuous in the Texas seed, or invisible in that from Missouri.

Figs. 28 to 32, *Vitis Vinifera*, from the Old World. Different forms are introduced here for comparison with the American species, and to show how much they differ among themselves. Fig. 28 represents a seed out of a lot of grapes (or raisins) found with an Egyptian mummy, and probably now 3,000 years old, or older. The specimens are preserved in the Egyptian Museum of Berlin. The berry obligingly donated to me was as large as the larger European cultivated grapes, and enclosed three seeds. It will be seen that it is the largest of the *Vinifera* seeds figured here, showing perhaps a slight modification of the seed in the ages that intervened between its and our times.

Fig. 29, *Brusca*, the native species of Tuscany (Northern Italy); Fig. 30, *Riesling*, cultivated on the banks of the Rhine; Fig. 31, *Gutedel (Chasselas)*, from the same region; Fig. 32, *Black Hamburg*, from a grapery near London. All these seeds are easily distinguished from all American grape seeds, by the narrower and usually longer beak (or lower part), and especially by the large circular, though not very prominent, chalaza, which occupies the upper, and not the middle part of the seed. These five specimen seeds represent the principal forms, but not all European grape seeds entirely agree with them.

Fig. 33, *Vitis Vulpina* (or *Rotundifolia*), from the South Carolina Muscadine grape, differs from all other grape seeds, just as the plant differs from all other Grape-vines; seed very flat, with straight sides, very short beak, wrinkled, or rather folded on both surfaces, notched on top, with very narrow chalaza and no visible raphe.

The North American Grape-vines may be systematically arranged in the following order:

I. True Grape-vines, with loose, shreddy bark, climbing by the aid of forked tendrils, or sometimes (in No. 12) almost without tendrils.

A. Grape-vines with more or less continuous tendrils.

1. VITIS LABRUSCA, *Linnæus*, the northern Fox grape, the mother of a great many cultivated varieties and hybrids.

B. Grape-vines with intermittent tendrils.

a. Leaves pubescent or floccose, especially on the under side and when young, often becoming glabrous with age.

* Raphe on seed indistinct.

2. VITIS CANDICANS, *Engelmann*. The Mustang grape of Texas.
3. VITIS CARIBÆA, *De Candolle*. The West India grape; rare in Florida.
4. VITIS CALIFORNICA, *Bentham*. The California grape.
5. VITIS MONTICOLA, *Buckley*. The Mountain grape of West Texas.
6. VITIS ARIZONICA, *Engelmann*. The Arizona grape.

** Raphe on back of seed very conspicuous.

7. VITIS ESTIVALIS, *Michaux*. Summer grape of the Middle and Southern States, with several varieties.
8. VITIS CINEREA, *Engelmann*. The Downy grape of the Mississippi Valley.

b. Leaves glabrous, or sometimes short, hairy, especially the ribs beneath; mostly shining.

* Raphe on back of seed conspicuous.

9. VITIS CORDIFOLIA, *Michaux*. Frost grape of the Middle and Southern States.

** Raphe indistinct.

10. VITIS PALMATA, *Vahl*. Red grape of the Mississippi Valley.
11. VITIS RIPARIA, *Michaux*. Riverside grape of the United States and Canada.
12. VITIS RUPESTRIS, *Scheele*. Rock or Sand grape of the Western Mississippi Valley and Texas.

VITIS VINIFERA, *Linnæus*. The Wine-grape of the Old World and California; would find its systematic place here.

II. Muscadine grape, with (on the younger branches) firmly adhering bark, which only in the older stems scales off; aerial roots from inclined trunks in damp localities; tendrils intermittent, simple; berries very large (7-10 lines thick), very few in a bunch, easily detaching themselves at maturity; seeds with transverse wrinkles or shallow grooves on both sides.

13. VITIS VULPINA, *Linnæus* (ROTUNDIFOLIA, *Michaux*). The Southern Fox grape or Muscadine.*

Rafinesque, Le Conte and others, have in times gone by attempted to distinguish and characterize a good many more species, while on the other hand, Director Regel, of the St. Petersburg botanical garden, has lately tried, rather unnaturally, to contract them and unite them with the Old World species. *Vitis Vinifera* has resulted, according to his views, from the hybridization of several of these species.

I now propose to give a short botanical account of the 13 species enumerated above.

I. VITIS LABRUSCA, Linnæus. Usually not large; climbing over bushes or small trees, occasionally reaching the tops of the highest trees; distinguished from all the other species, as has been stated above, by its continuous tendrils, and consequently by its continuous (two to often four or six) clusters of flowers and fruit; stipules middle-sized, about two lines long, or less; leaves large (four to six inches wide), thick, of firm texture, entire or in some forms deeply lobed very slightly dentate, coated when young with a thick rusty, or sometimes whitish down, which in the wild plant persists on the under side, but almost disappears in the mature leaf of some cultivated varieties; berries

* The name *Vulpina*, was first applied by Linné, but others after him have applied it to different species. To avoid this confusion, Planchon and others adopt the name ROTUNDIFOLIA *Michaux*.

large in middle-sized, or, in many cultivated forms, rather large bunches, bearing two or three or even four seeds, large, notched, without visible raphe. (See table of seeds, page 11, Figs. 1 and 2.)

This species, usually known as the Fox grape, or Northern Fox grape, is a native of the Alleghany Mountains, and of their eastern slope to the sea-coast, from New England to South Carolina, where it prefers wet thickets or granitic soil. Here and there it descends along streams to the western slope of the mountains, but is a stranger to the Mississippi Valley proper.

As the *Labrusca* generally grows on granitic soil or granitic detrities, which may favor the vine,* I would suggest to plant Catawba vineyards in the granitic regions of our Ozark Mountains, and would expect favorable results there.

By far the largest number of varieties of grape-vines now cultivated in our country are the offspring of this species; a few produced by nurserymen, but most of them picked up in the woods; they are easily recognized by the characters above given, and most readily by the peculiar arrangements of the tendrils as above described. Large and downy-leaved varieties of *V. Æstivalis* are, in the west and southwest, not rarely mistaken for *Labrusca*, but the two may always be distinguished by the characters indicated.

It is also the species which has most generally been used as one of the parents (mostly the mother) in artificial hybridization, and as it is the most individualized or specialized of all our (perhaps of *all* known) grape-vines, its characters unmistakably prevail in the hybrids, and rarely leave a doubt as to where to refer the questionable form; of which I shall have to add a few words below, under the head of *Hybrids*.

2. Vitis Candicans, Englemann. (*V. Mustangensis*, Buckley). The Mustang grape of Texas; a tall climber, with rather large, rounded, almost toothless leaves, white cottony on the under side, bearing large berries, which, like those of the wild *Labrusca*, show different colors, greenish, claret and bluish-black; and which, in its native country, are made into wine. In young shoots and sprouts the leaves are usually deeply and elegantly many-lobed, which, with the contrast of the deep green upper and pure white under surface, would make this species a most elegant vine for arbors, if it could be protected from severe frost. This may be done by laying it down and covering it with soil. In Texas it grows in the lower country, as well as on the calcareous hills, and extends even into the granitic region. It has also been found in Florida, where many Texas plants are again met with. The Florida form, at one time taken for Vitis Caribæa, but quite distinct from it, has shorter and comparatively thicker seeds. (Fig. 8).

3. Vitis Caribæa, de Candolle, is a West Indian species which has lately found its way, with other tropical plants, into southern Florida. It has a downy, cordate leaf, not lobed, but characterized by the small but very sharp, distant teeth. Its black berries are small and mostly bear but one or two seeds. I find the Florida seeds (Fig. 9) which were kindly sent to me by Mr. A. H. Curtiss, the discoverer, larger than those of the West Indian type.

4. Vitis Californica, Bentham. The only wild grape of our Pacific coast; a low bush a foot or two high, in dry beds of streams in southern Oregon; it becomes a tall climber in southern California, with a stem three inches or more in diameter; it is distinguished by its cordate, rounded, whitish, downy leaves and small black berries in large bunches; the obtuse but scarcely notched seeds (Figs. 10 and 11), without or with only a trace of a raphe, and with a narrow, long chalaza. No use is made of this species, but it has lately been recommended as a grafting stock for European vines in California vineyards which have been attacked by the Phylloxera. For even this grape-vine, which is a native of a country originally entirely free from the insect, is as proof against it as any of our Mississippi Valley vines.

5. Vitis Monticola, Buckley. Usually a small bushy vine, rarely climbing over higher trees; branchlets angled; young stems, petioles and leaves cottony, downy, the down gradually disappearing, remaining only here and there in flocose bunches; stipules very short (½ line long); leaves deeply cordate, with a rounded sinus, very shortly three-lobed, edged with small but broad teeth, rather wrinkled on the upper surface, but the older ones very smooth and often conspicuously shining below (especially in the dry specimens); usually small, not more than three inches across, only on vigorous shoots three or four inches wide; tendrils intermittent, in the smaller, bushy forms, often withering away; bunches of fruit compact, short; berries 4, or rarely 5 lines in diameter; seeds obtuse or slightly notched, chalaza rather narrow, extending upward into a broad groove, but without a visible raphe.

* Planchon, in a note to the French edition, remarks: The fact that the wild Labrusca grows in granitic soil (terrains siliceux) may explain why the cultivated varieties of this species do not succeed in Europe except in silicious soils and are often attacked by yellows (a disease) on limestone soils.

This is one of the smaller species and is peculiar to the hilly, cretaceous region of western Texas, not extending to the lower country nor to the granitic mountains; common about San Antonio, New Braunfels, Austin, etc.; also occasionally cultivated about San Antonio, when the bunches, as well as the berries, become larger. This plant has given rise to a great deal of speculation and controversy. About fifty years ago, the Swiss botanist, Berlandier, collected it in West Texas,* but it was not till twenty-five or thirty years later that Prof. Buckley named and published it. Unfortunately his description was so insufficient that no botanist could recognize the plant; only the Texans of those regions, who well knew "the little mountain grape," understood what he meant. Buckley's mention of a middle-sized green, very palatable berry has misled French botanists to look for this plant among the numerous forms of *Labrusca*, and Prof. Planchon therefore changed the name to *Vitis Berlandieri*.† In justification of Buckley's description it is now said that there exists a form of this species, especially about Fredericksburg and on the borders of the Llano Estacado, with somewhat larger, green berries, which I understand Mr. J. Meusebach is trying to find out, and to introduce into cultivation. The species will readily grow from cuttings.

6. Vitis Arizonica, Engelmann, is closely related to the last, and has similar seeds, but the flat raphe, though rarely prominent, is broad and sometimes inconspicuous; branchlets angular; leaves cordate, with a rather open, rounded sinus, not lobed, or with two short latent lobes; floccose, cottony when young; glabrous, thick, very rigid, and (especially on the upper surface) rough, when older; berries small or middle sized, reported to be of luscious taste.

7. Vitis Æstivalis, Michaux. Climbing over bushes and small trees by the aid of forked, intermittent tendrils; branchlets rounded, bark of the mature ones mostly red, and scaling off in large flakes; leaves large (4–5 or 6 inches wide), of firm texture, entire, or often more or less deeply and obtusely 3–5 lobed, with rounded sinus and with short and broad teeth; when young always very woolly or cottony, mostly bright red or rusty; at last smoothish but dull, pale or glaucous beneath, and never shining; stipules very short and rounded, mostly rusty-downy; berries middle-sized, black, 5–7 lines, (in southwestern forms even 8–9 lines) in diameter, coated with a bloom, when well-grown in compact, often cylindrical bunches: seeds rather large, mostly two or three in each berry, rounded on top, showing a very prominent, cord-like raphe, and more gradually attenuated into the beak than is common in our species.

This is the well-known summer grape, common throughout the Middle and Southern States, usually found on uplands and in dry, open woods or thickets, maturing its fruits in September. It is one of the most variable of our grape-vines, and hence has seduced many into the establishment of numerous nominal species, while others, and among them myself, have assumed too wide limits for the species, and have classed under it forms which now, since we know them better, have to be kept separate. Among the latter I mention *V. Monticola* and *V. Cinerea*, which are described in their proper places. Among the former I must still retain with *V. Æstivalis* the form that had been distinguished by Buckley as *V. Lincecumi*. This latter, often more bushy than climbing, has larger berries, leaves often deeply 3–5 lobed, and coated with a thick rusty down, or tomentum, which is often quite persistent. Forms with very large, woolly leaves have often been taken for *Labrusca*, and this species, abounding in the sandy post-oak (Quercus stellata) woods of eastern Texas, and there known under the name of Post-oak grape or Sand grape, but extending also to Arkansas and Missouri, has thus been quoted for the Western and Southwestern States, to which the true *Labrusca* is an entire stranger.

This species is one of the most important ones for us, and in the West at least, has already taken the place once accorded to the Labrusca forms in our cultures, not only for their greater, aye absolute, resistance to the Phylloxera, but also for their intrinsic value as wine (and even table) grapes, notwithstanding the superior size of the Labrusca berries. Unfortunately the typical forms cannot be propagated by cuttings, and there are a number of varieties which, originating from a southern home, are not quite hardy here, but, on the other hand, have the advantage of being readily propagated by slips, in some

* On his specimens I found the first Phylloxera galls, which, thus accidentally preserved, prove the existence of the insect in America (doubted, however, by no one now) long before it became known to science here or in the Old World, and also prove its existence as far south as Texas. *Engelmann.*

† Planchon retained the name Vitis Berlandieri for the vine discovered by Berlandier, and now cultivated in France under the name "Sweet Mountain" grape. Buckley describes his Vitis Monticola as fruit with white berries of medium size and delicious taste, while the fruit of Berlandieri has small berries, black and of acrid taste, he therefore deems it safest to give the plant a precise name which can be well defined. Practically, says Planchon, the Vitis Berlandieri may acquire a real importance as it imparts to the grapes which may be inserted thereon a remarkable vigor and fertility. (See also "Munson's classification and viticultural observations," pages 20 29).

favorable localities. Their leaves are thinner than those of our type, and woolly only in the first youth; the bunches are larger, more shouldered; the berries, though small, are much sweeter and more juicy. They comprise among others the *Cunningham*, with less divided, and the *Herbemont* and the *Lenoir* with deeply lobed leaves, the two former with lighter colored, the latter with deep black berries. Unfortunately no wild plant from which these varieties might have sprung is yet known, but must be looked for in the mountains or hills of the Carolinas and Georgia, *and only when found in a wild state can we correctly judge of their botanical status.* About their viticultural relations, the body of this work has to be consulted. I will only state here that a slight suspicion exists of their being hybrids between *V. Æstivalis* and some form of *Vinifera.** Though the seeds are entirely those of the former, and also the resistance to Phylloxera. The variety *Lenoir*, often named *Jaquez*, and in Texas *Black Spanish*, has been introduced by millions into southern France, and is there found to furnish not only an excellent stock whereon to graft their own vines, but also to make a superior wine directly, and one very rich in the deep coloring matter so highly prized there.†

8. Vitis Cinerea, Engelmann, closely allied to *Æstivalis*, with which I had formerly united it as a variety, of pretty much the same size, rarely taller. It is distinguished by its whiteish or grayish pubescence, which, especially on the branchlets, is quite persistent, even into winter; by the angular branchlets, the hair being especially developed on the angles; the cordate often entire, or slightly three-lobed, more or less gray-downy leaves, which often resemble a Lindenleaf, with a rounded but usually rather narrow sinus; by the large, loose inflorescence, which opens its flowers rather later than any other of our species; by the small black berries, about four lines in diameter, without a bloom, of a pleasantly acid taste, until frost sweetens them, and by the small, plump seed with a short beak.

This species is found in rich soil in the Mississippi Valley from Central Illinois to Louisiana and Texas, especially in bottom lands and along the banks of lakes, in situations where we scarcely ever met with *Æstivalis*. It is quite abundant in such localities near St. Louis.

9. Vitis Cordifolia, Michaux. This is the tallest of our climbers at home in our deep bottom woods, but often also a low trailer over bushes and hedges, well known as the Winter, or Frost grape, flowering late and maturing late its strongly flavored, shining black berries.

The plant is glabrous, or the branchlets and lower surface of leaves somewhat hairy; branchlets indistinctly angular (in this respect intermediate between the last two species); diaphragm at the nodes of the branches thick, rarely, at the lower nodes, wanting; leaves rather large, three to four inches wide, or more, not lobed at all, or slightly three-lobed, cordate, with a deep narrow, or wider, but always sharp sinus, margined with conspicuous, rather large sharp-pointed teeth; stipules short; flowers in large, usually loose clusters, blooming rather late; berries small (three or four lines through), black and shining, with a peculiarly disagreeable and strong flavor; edible only after frost; seed, with slight or strong raphe.

A common plant from the Middle States southward to Texas; not known, I beleive, in northern New York or New England, but not rare in Pennsylvania and New Jersey, and found also near the city of New York; very common in the deep soil of the western river valleys, where it takes its fullest developement. There the trunk sometimes reaches thirty to thirth-eight inches in circumference (southern Missouri, along the Iron Mountain Railroad); whether the trunk found by Mr. Ravenel at Darien, Georgia, measuring forty-four inches around, belongs to this species, I cannot tell, but his supposition that it was *Æstivalis* is quite improbable; the statement of newspapers that a grapevine in Gulf Hammock, in Florida, had a circumference of sixty-nine inches, is considered a "fish story" by Florida botanists.

The acute, mostly narrow sinus of the leaves, the small stipules, the broad diaphragms, the character of the seeds, the circumstance that it don't grow from cuttings, and the late flowering time, abundantly distinguish this species from *Vitis Riparia*, with which it has been thrown together so long and so obstinately.

10. Vitis Palmata, Vahl, has been cultivated in the Jardin des Plantes in Paris for perhaps one hundred years or more, and has thence found its way into other European gardens, without, however, as it seems, hav-

* See Munson's classification later on, p. 20, under his series 5, *V. Bourquiniana.*

† In Solano County, California, a Mr. Wolfskill grafted European vines in his vineyard (1878) on the stock or cuttings of a vine supposed to be the *Lenoir*, but ascertained since to have been obtained by Mr. Wolfskill from Alabama under the name of "*Coon-grape*," a wild Aestivalis variety. It has a leaf much like the Lenoir but bears a small, compact bunch of sweet black berries. These grafts are bearing regularly while Vinifera vines around have long since been destroyed by the Phylloxera. This may be of interest; perhaps, the "Coon-grape" of Alabama is the long-looked for wild plant from which the *Lenoir* (Jacquez, Black Spanish) originated?

ing attracted the attention of botanists, since its first publication, in 1794.

Vahl's description is accurate enough, with the exception of its native country, which he gives as "Virginia," a negligence or ignorance which we must not criticise too severely in botanists of a century ago. The seed was originally brought to Paris probably by French missionaries, who, as is well known, roamed about in the Mississippi Valley one and two hundred years ago. Soon after the publication of Vahl's description of this grape, above mentioned, Michaux discovered this interesting species "growing abundantly on the banks of the streams in Illinois," and named it *V. Rubra*. He don't seem to have recognized the vine which he might have seen growing under his eyes in Paris, and eventually he merged his specimens of this Vitis in his herbarium under *V. Riparia*.

Last fall Mr. H. Eggert, of St. Louis, re-discovered this long neglected plant on the banks of the Mississippi, opposite Alton, and collected it there again this summer, when it proved to be the latest blooming of all our species (far from blooming yet to-day, June 10th). There can be no doubt of the indentity of this plant with Vahl's *V. Palmata* and Michaux's *Rubra*, nor of its entire distinctness from *Riparia*. It is found, with this last one, covering willow thickets and other bushes in low grounds, overflowed during high water. Its bright red branches, from which the bark separates in large flakes, conspicuous between the smooth but dull, darkish foliage (much darker than *Riparia*), show at once how appropriate Michaux's name is. The diaphragms are thick. The leaves have a broad sinus, and are shallow or often deeply three, rarely five, lobed, the lobes usually draw out into long and slender points; the under side is often somewhat hairy along the nerves; stipules middle sized, 1½ to 2 lines long; flower bunches large and loose, on long stems; berries rather small (4-5 lines through), black, without bloom; seeds one or two, very large and plump, rounded, with very short beak, notched on top, without a visible raphe.

Our plant is readily distinguished from *Riparia* by the thick diaphragm, the red branches, its late flowering and its bloomless, late ripening berries; from *Cordifolia* the form of the leaves and its ready growth from cuttings, easily separate it.

11. Vitis Riparia, Michaux, the grape-vine of the river banks, has lately acquired a great deal of importance, as it has now become the principal grape-vine relied on in France for the renovation of their failing vineyards for which its vigorous growth, adapted to almost all climates, its perfect resistance to the insect, its easy growth from cuttings, and its ready taking of grafts, seem to peculiarly fit it.

This species climbs over bushes and small trees, or trails over the rocks on our river banks. It is also found inland, always near water, on larger trees, where its trunk may become six inches thick. The branchlets are rounded, not angled; the diaphragms very thin ($\frac{1}{8}$ to $\frac{1}{4}$ line thick); the stipules large (2–3 lines long) and very thin, and persist longer than in most other species; leaves of a light green, shining, glabrous or often hairy below, with a wide, rounded, or even truncate sinus; they are more or less tri-lobed, margined with large, sharp-pointed teeth. The bunches are mostly small and compact; berries small (four or rarely five lines in diameter), black, with a bloom, sweet and juicy, scarcely pulpy; seeds (Figs. 22 to 25) obtuse or slightly notched, with a narrow chalaza, raphe indistinct or very thin.*

It has the widest geographical distribution of any of our grape-vines, and is the hardiest of them all. It extends northward to Lake St. Jean, ninety miles north of Quebec, and to the banks of the Upper Mississippi in Minnesota, and the shores of Lake Superior; in the South it is common on the banks of the Ohio and in Kentucky, Illinois, Missouri and Arkansas,† and in the Indian Territory. I have not seen it from Louisiana or Texas, but a form of it is found in the Rocky Mountains of Colorado and New Mexico, and perhaps in southern Utah. It is the earliest flowering species about St. Louis, according to season, between April 25th and May 15th, and matures earlier than any other. In St. Louis it used to be brought to market, before we had cultivated grapes, sometimes as early as July 1st, from the rocky, sun-exposed banks of the river below town, and was, indeed, known as the "June Grape." From that time on ripe fruit is found, according to locality, through August and September. It is singular that our vintners, as far as I can learn, have never made wine from this species, nor tried to cultivate and improve it. The

* The French now distinguish several types of Riparia, different somewhat in their minor characteristics.

† A peculiar form of *Riparia* is a plant which I found fifteen years ago in the botanic garden of Berlin, under the name of *Vitis Solonis*, and about the history of which nobody seems to have known any thing. Lately this plant has been taken up in France with that zeal so characteristic to that nation, as something possibly of particular interest for their viticultural pursuits. It is distinguished from the ordinary form by the long and narrow, almost incised, crowded teeth of the scarcely three-lobed leaves. The name is undoubtedly a corruption of "Long's," and the plant comes from the Upper Arkansas river, where Major Long, on his return from his expendition to the Rocky Mountains, found, as he reports, such excellent grapes. Seeds may have been brought home and the plant raised as "*Longs.*" A manuscript of the viticulturist Bronner, preserved in the Carlsruhe library, speaks of a certain grape-vine as "*Long's, from Arkansas*," and it is reported that *Long's* is still growing in the late Mr. Bronner's garden at Wisloch, near Heidelberg, and that it is indentical with *Solonis*. As an example of curious speculative interpretation it may be stated that some viticulturist had read *Solonis* for *Zanis* (an oriental grape), and *Arkansas* for *Caucasus*.

The French edition adds to this remark of Engelmann, about the specious explanation of the name "Solonis" that the grape observed by Major Long, is, no doubt, Vitis Rupestris and *not* the Vitis Solonis (as explained by M. Lespiault, in Vignes Americaines, 1881 and by Planchon in same 1884). The existence of Vitis Solonis has also been discovered in the herbarium of the Botanical Garden of Brussels in 1835, already; (under the evidently erroneous name of Isabella!). See Munson's classification, series 3, and observations, page 24.

berries probably seem too small, and they may have expected better results from the larger fruits of *Æstivalis;* but the experiment might yet be made, and our woods might be examined for larger-fruited varieties, which really do occur, e. g., along the Lakes and on Niagara, near Detroit, etc.

As has been stated above, this species has been confounded with *V. Cordifolia*, to which indeed, it bears a certain resemblance; but the characters enumerated, especially those of the diaphragms, the stipules, the form of the leaf and its base, its flowering time, and above all the seeds, distinguish them as well as any two species can be distinguished, even if the difficulty of one and the readiness of the other to grow from cuttings be not taken into account.

12. Vitis Rupestris, Scheele, mostly a low, bushy plant, often without any, or with weak, deciduous tendrils, and not climbing, under favorable circumstances becoming stouter and climbing pretty high; branchlets rounded, diaphragm thicker than in *Riparia*, but thinner than in other species; leaves rather small (about three inches wide), broadly cordate, rarely very slightly lobed, mostly broader than long, usually somewhat folded together, with broad, coarse teeth, and commonly with an abruptly elongated point, glabrous, shining, of a very pale green color; stipules almost as large as in last species, 2–2½ lines long, thin; berries small or middle-sized, sweet, and in very small bunches; seeds obtuse, with a slender or almost invisible raphe.

This grape vine, of very peculiar aspect, is a native of the hilly country west of the Mississippi river, from the banks of the Missouri to Texas, and is also found on the Cumberland river near Nashville; its favorable localities are gravelly banks or bars of mountain streams, overflowed in spring, more rarely (in Texas) on rocky plains. In Missouri it is called Sand grape, in Texas often on account of its luscious fruit, Sugar grape; with us it flowers soon after Raparia and ripens in August, and is said to make a good wine. In France the *V. Rupestris* is used, like the last species, as a grafting stock for French vines; it grows easily from cuttings, and is said to make vigorous plants, perfectly resistant to the insect.

Vitis Vinifera, Linnæus. Here would be the place to introduce the grape-vine of the Old World, as it is most nearly allied to the last enumerated species, especially to *V. Riparia*. Though many of its cultivated varieties bear berries as large, or even larger, than those of any of our American grape-vines; other cultivated forms, and especially the true wine-grapes, those from which the best wines are obtained, and also the wild or naturalized ones, have fruit not much larger than that of the above named native species.

This plant, together with the wheat, belongs to those earliest acquisitions of cultivation, the history of which reaches beyond the most ancient written records. Not only have the sepulchres of the mummies of ancient Egypt preserved us its fruit (large sized berries) and seed, but its seeds have even been discovered in the lacustrian habitations of Northern Italy. It is a mooted question where to look for the native country of this plant, and whether or not we owe the different varieties of our present *Vinifera* to one or to several countries, and to one or to several original wild species, which, by cultivation through uncounted ages, and by accidental and repeated hybridization, may have produced the numberless forms now known. These remind us forcibly of the numerous forms of our dog, which we cannot trace, either, but which can scarcely be derived from a single (supposed) original wild species. Director Regel, of St. Petersburg, ascribes them to the intermingling of a few species, well known in their wild state at this day. The late Prof. Braun, of Berlin, suggested that they are the offspring of distinct species yet found wild in many parts of Southern Europe and Asia, which thus he considered not the accidental offspring of the cultivated plants, as is generally believed, but the original parent stock. I may add, from my own investigations, that the grape-vine which inhabits the native forests of the low banks of the Danube, "bottom-woods," as we would call them, from Vienna down into Hungary, well represents our *V. Cordifolia*, with its stems three, six and nine inches thick, and climbing on the highest trees, its smooth and shining, scarcely lobed leaves, and its small, black berries. On the other hand, the wild grape of the thickets of the hilly countries of Tuscany and Rome, with its lower growth, somewhat cottony leaves, and larger and more palatable fruit, which "don't make a bad wine," as an Italian botanist expressed himself to me, reminds us, notwithstanding the smaller size of the leaves, of the downy forms of *Riparia*, perhaps of some *Æstivalis*. It was known to the ancients as *Labrusca* a name improperly applied by science to an American species, and is called by the natives to this day *Brusca*. The grape-vines of the countries south of the Caucasus Mountains, the ancient Colchis, the reputed orginal home of these plants, greatly resemble the Italian plant just described.

The European Grape-vine is characterized by smoothish, and, when young, shining, more or less deeply, five or even seven-lobed leaves; lobes pointed and sharply toothed; seeds mostly notched at the upper end; beak elongated; raphe indistinct; chalaza broad, high up the seed. In some varieties the leaves and branchlets are hairy and even downy when young; the seeds vary considerably in thickness and length, less so in the shape of the raphe. It is well known that the plant grows readily from cuttings, and that it easily and almost invariably succumbs to the attacks of the Phylloxera, which, accidentally introduced into France, probably with American vines, has done such immense damage in that country and in the rest of Europe, probably since 1863 (though only discovered as the virulent enemy in 1868), and is spreading more and more. In California, where thus far the *Vinifera* has been successfully cultivated, the insect also begins

to make its appearance in some localities. That it was the cause of the complete failure in all the efforts to plant the European vine east of the Rocky Mountains, is now well known.

13. VITIS VULPINA, Linnæus (better known as V. ROTUNDIFOLIA, Michaux), the *Southern Fox grape*, *Bullace* or *Bullit grape*, or *Muscadine* of the Southern States, is entirely different from all our other grape-vines, and is mentioned here only to complete the list of our species. It is too tender for our climate, and never flowers or fruits here. It is found in damp thickets or on mountain slopes, some times a low bush, and again climbing very high, with entire, never forked, tendrils; branchlets without any diaphragm (see Fig. 37); leaves small (two, or at most, three inches wide), rounded, heart-shaped, firm and glossy, dark green, smooth, or rarely slightly hairy beneath, with coarse and large or broad and bluntish teeth. The bunches are very small, of few very large berries, which fall off singly, like plums. The peculiar seed has been figured and described above (page 11, Fig. 33). In the South some of the varieties are highly esteemed, especially the White Scuppernong.

HYBRIDITY.

Plants, which are so intimately related among themselves, are apt to hybridize, and their offspring is usually fertile, not like many hybrid animals (the mule) or plants incapable to propagate. We have a number of artificial hybrids among grape-vines, whose history is well known, and which bear as well as the true species, and their seeds are fertile. But we also find other vines in the woods or in vineyards, which, from their characters, we must conclude to be spontaneous hybrids. There is, of course, a good deal of experience and judgment necessary to decide what may be justly claimed to be a hybrid, and what only a variety within the limits of some variable species, and the opinions of different persons may honestly vary on these points. But whoever has studied the great variability of many plants will hesitate long before he calls to his aid the often fanciful help of hybridity in the explanation of doubtful forms. Where species are so well marked as e. g. *Labrusca* is, it is not difficult to recognize some of its characters in a hybrid offspring, though the general looks of the questionable plant otherwise may not conform to our idea of *Labrusca* at all; but in other cases, where species already stand near one another, the matter becomes much more difficult. But there is another way, unfortunately a very tedious one, to assist in such investigations, viz: to sow the seeds of hybrids and study their offspring; for it is a fact that seedlings of hybrids are apt to revert to, or at least to approach to, one or the other of the parents. One of the most striking examples of both positions here taken is furnished by the well-known Taylor or Bullit grape. The vigorous growth of this form, its thin diaphragms, its glossy, glabrous foliage, its small clusters of rather small berries entirely destitute of foxy taste, all seem to point to it as a cultivated variety of *Riparia;* but when we come to examine the tendrils we fine that they are irregular; sometimes intermittent, sometimes more or less continuous (I have seen six in succession, which can only point to *Labrusca*), and just so the seeds differ from *Riparia* seeds by their great size and their form (see page 11, Fig. 3). Now it so happens that Taylor seeds have been planted by the million in Europe, in order to raise resistant stock for grafting, and the general experience is that one cannot find two seedlings in a hundred alike, and similar to the mother-plant; some approach the *Riparia* type, and others show the *Labrusca* parentage distinctly. Thus, to give only one example, one of such seedlings—the now frequently cultivated *Elvira*—is a Taylor seedling with a close approach to *Labrusca*.

It would further the study of our grape-vines considerably if some of those that have the zeal, the leisure and the opportunity, would institute such experiments with doubtful forms.

Pursuing this interesting subject further, I may add that where nearly allied species grow near together, and bloom about the same time, they are more likely to hybridize than such species that are separated by wide space or different period of flowering. With all these considerations we must not forget that with the innumerable opportunities given everywhere for hybridizations we find comparatively so few spontaneous hybrids in the vegetable world. Hybridization is an abnormal, I may say, an unnatural process, which is usually prevented by countless obstacles. If it were not so, we would meet with more hybrids in our woods and prairies than with genuine species; but how rare are they, and what a find it is for a botanist to discover one! * And this is the more to be wondered at, because the genital organs of the plants, though mostly united in one flower, are usually so organized that self-fertilization is made difficult, or is excluded, and that cross-fertilization is the rule. We may put it down as a law that honest nature abhors hybridization.

* Accidental wild Hybrids are very scarce, no doubt, where the normal time of blooming of the species, such as Riparia, Æstivalis and Cinerea, varies too much to make such crosses probable; but where you find different species blooming simultaneously it is quite different.

Friend Jaeger of Neosho, S. W. Missouri, tells us that there are localities in the Indian Territory where hybrids, between Riparia and Rupestris are more numerous than the pure type of either species; in Red river bottom, near Denison, Texas, he also found Riparia×Candicans *very* numerous, not to mention the many "Vignes Champin." Had Dr. Engelmann lived a little longer it would have been easy to change his views about spontaneous hybrid grape-vines.

EDITORS'

INTRODUCTORY REMARKS

TO THE

CLASSIFICATION

AND

VITICULTURAL OBSERVATIONS

Upon the Native Species of American Grapes.

BY T. V. MUNSON.

Perhaps the first plant noticed on the Continent of North America, even before Columbus and before the Pilgrims, was the grape-vine; it gave to this country the name Vineland, and later, to part of it, that of Martha's Vineyard.

And yet—said our late Dr. Geo. Engelmann*—yet, the grape-vine, many forms of which grow from Canada to the Rio Grande, and from Virginia to California, are among the least thoroughly known plants of North America.

I have long devoted much attention to the grape-vines of my home—continues the great, modest botanist he ever was—but have become satisfied that no satisfactory solution can be obtained without the co-operation of the friends of botany throughout the whole country. . . . In order to arrive at satisfactory conclusions, it is necessary—said Dr. Engelmann—to study all the forms which present themselves in all their bearings and under different conditions in which they are found.

Prof. T. V. Munson has taken up this botanical investigation, which Dr. Engelmann desired and pronounced to be necessary, where the latter has left it, and, certainly, no other man is as well qualified for the task as our friend *Munson*. He combines the scientific preparation† with the perseverance, love and devotion which its study demands, besides the knowledge and experience of the practical viticulturist and successful hybridizer. He has studied the grape herbaria in Harvard, in the Academy of Science at Philadelphia and in the U. S. Department of Agriculture, as well as Engelmann's collection in the Missouri Botanical Garden, and has made besides his own most extensive collection, mostly raised to bearing vines from seed. through germination; and has observed the vines of nearly every species in their native habitat, while traveling, more than fifteen years, for their examination, thousands of miles in the United States. While highly appreciating Engelmann's classification as the best up to the time, yet Mr. Munson could not help finding it incomplete and embodying some errors. He had accumulated many facts unknown to Engelmann, who wrote himself that "our species vary to such a degree, that both scientific and non-scientific observers have never felt satisfied about them." The more our friend *Munson* studied the species, side by side, the more he felt s tisfied with his arrangement into series, as being the best exhibit yet made of the natural affinities. And he has given the result of his research to the U. S. Department of Agriculture in a monograph on American grapes, which is to be published some day; but it has, so far, failed to get the necessary appropriation.

The entire series of colored plates, natural size, made by an artist from fresh specimens, are all complete—but there the work rests.*

To publish the entire monograph with full descriptions and illustrations is a work most worthy of the early attention of the Agricultural Department of our Government, for whose treasury the cost would be a mere trifle; whilst the value, the benefit to be derived from this work would be incalculable. It would not merely be interesting to the botanical student, but of great practical importance, treating on the questions to what purpose the vine can serve, whether for table fruit or for wine, or for hybridizing. or as grafting stock; what climate it can endure, what diseases one species may resist better than others. We wish and hope that it may be published soon; in the meantime, friend Munson has permitted us to present to the readers of the Bushberg Catalogue a synopsis of his classification, with his own Viticultural Observations on some of our native species. (And we had some photo-engravings made, reduced, after his original plates, for this Grape Manual.)

* Botanical Works of the late George Engelmann, collected for Henry Shaw, Esq., edited by William Trelease and Asa Gray; p. 412.

† *Munson* occupied a chair in the Sciences at the Kentucky State Agricultural College and was honored by the Government of France with the title of "Chévalier du Merite Agricole" and the decorations of the Legion of Honor. He is generally called and recognized as "Professor Munson," and is now President of the State Horticultural Society of Texas, etc., etc.; but he is not pleased with titles and needs none; we are pleased to call him simply "our friend Munson."

* At the World's Fair. 1893, in Chicago, Munson made the most complete botanical exhibit of the genus ever made, and he presented it then to the U. S. Department of Agriculture to be a permanent display in the Division of Pomology.

CLASSIFICATION.

GENUS, VITIS, TOURNEFORT

(LINNÆUS *pro parti*).

Specific No.

Series 1. RIPARIÆ.

Vitis RUPESTRIS, (Sheele) ... 1

Vitis VULPINA (Linnæus), better known as V. RIPARIA (Michaux)* ... 2

(V. Palmata.—Vahl).

(Dr. N. L. Britton, curator of the Columbia College, Herbarium, after visiting Europe in 1893, and examining Linnæus' original specimen of V. Vulpina, wrote me that it is certainly identical with *V. Riparia* Mx., thus agreeing with J. E. Planchon).

Vitis *Solonis*, (Hort. Berol) ... 3

Vitis DOANIANA, (Munson) ... 4

All excellent for hybridizing other species.

Series 2. OCCIDENTALES.

Vitis Arizonica, (Engelmann) ... 5

Cañon grape of Arizona.
Var. glabra, (Munson).

Vitis Girdiana, (Munson) ... 6

The south California species.

Vitis Californica, (Bentham) ... 7

The north California species.

Series 3. CORIACEÆ.

Vitis Champini, (Planchon) ... 8

Vitis Candicans, (Engelmann) ... 9

"Mustang grape" of Texas.

Vitis Coriacea, (Shuttlworth) ... 10

Florida.

Series 4. LABRUSCÆ.

Vitis Labrusca, (Linnæus) ... 11

Series 5. ÆSTIVALES.

Vitis Vinifera, (Linnæus) ... (a)

European and Asiatic,

Specific No.

Series 5—Continued.

Vitis Bourquiniana, (Munson) ... (b)

Herbemont, Lenoir, &c.**

Vitis Lincecumii, (Buckley) ... 12

"Texas Post-oak grape."
Var. glauca, (Munson).

Vitis Bicolor, (Leconte) ... 13

"Blue grape."

Vitis Æstivalis, (Michaux) ... 14

Vitis Simpsonii, (Munson) ... 15

Series 6. CORDIFOLIÆ.

Vitis Cordifolia, (Michaux) ... 16

"Frost grape," "Possum grape"

Vitis Rubra, (Michaux); Vitis Palmata, (Engelmann ... 17

Southern Illinois; ornamental.

Vitis Monticola, (Buckley) ... 18

"Sweet Mountain grape," southwest Texas.

Series 7. CINERASCENTES.

Vitis Baileyana, (Munson) ... 19

Syn. Virgin'ana, (Munson).†
Mountain Streams, southwest Virginia.

Vitis Berlandieri, (Planchon); Vitis Monticola, (Engelmann) ... 20

Southwest Texas.

Vitis Cinerea, (Engelmann) ... 21

Sweet winter grape, eastern Texas.
Var. Floridana, (Munson).

Vitis Caribeea, (De Candolle) ... 22

West Indies and eastern Mexico.

Vitis Blanconii, (Munson) ... 23

Sierra Madre Mountains, Mexico.

Section II.—PUNCTICULOSIS.

Series 8. MUSCADINIÆ.

Vitis Rotundifolia, (Michaux) ... 24

V. Vulpina, (Gray and Engelmann).
"Muscadine grape" of the South.

Vitis Munsoniana, (Simpson) ... 25

"Bird grape." (Mustang grape, Chapman).

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* *V. Vulpina.* Conforming to the rules, now almost universally adopted among *botanists*, to apply the oldest name ever used by a botanist of standing, Munson gives preference to "*V. Vulpina*," being the earliest name, established by LINNÆUS; it was found to be certainly identical with *V. Riparia* of MICHAUX. Originally the *V. Labrusca* was popularly known as the Northern Muscadine and the *V. Rotundifolia* as Southern Muscadine, while V. Cordifolia is commonly called *Fox grape*, and common people as well as botanists regarded then the small sour grapes of New England as "*cordifolia*," i. e. Fox grapes, (after Æsop's well-known fable). Hence the name "*Vulpina*," and Munson says: it had better be observed, as the surest way out of confusion; moreover, he considers the name *V. Riparia* (riverside grape) not very appropriate, as there are several species that grow along river banks.

The editors of this catalogue beg to prefer the name *V. Riparia*, to which they will ever remain attached. ENGELMANN, PLANCHON and many others adopted it. To one botanist, who may call it Vulpina, adding: "or Riparia," thousands of grape-growers know it under no other name than Riparia. Custom must rule, it is the source of law.

** This reminds us forcibly of the "*Pedro Ximenes*" (called also "White Green Riesling), which was believed to have been brought to Spain from the banks of the *Moselle* by the man whose name it bears, Count ODART, a celebrated ampelograph, wittily said: "If he (Ximenes) took any he took ALL, for no *such* vine grows now north of the Pyrenees." Thus we also think: If Mr. Bourquin took any of the above grapes he took ALL, for no *Herbemont* or *Lenoir* can now be found native in Europe.—B. & S. & M.

† *V. Virginiana* had already been used as a synonym for *V. Vulpina*, and probably some other species, hence a new name is required by botanical rules of classification. Munson chose the name *Bayleyana*, in deference to Prof. L. H. Bailey.

Fig. 41. VITIS RUPESTRIS, Sheele.

(Rock Grape, Sugar Grape, Sand or Bush Grape.)

VITICULTURAL OBSERVATIONS

Upon the Native Species of American Grapes.

BY T. V. MUNSON.

After eliminating those species from which no considerable practical benefit may be derived in viticulture, however interesting they are botanically, I will confine myself in these "Observations" to those species which possess very valuable qualifications either for graft stocks, resisting Phylloxera, or to grow in very dry, limy or chalky soils, such as are found in cretaceous "black waxy" and "white rock" soils of Texas and in the Charente Inférieure of France, and may aid the skillful vigneron in developing most valuable varieties of grapes, as direct producers of wine or for the table, for all our regions.

The species mainly to be considered in this connection, are:

	Series.
V. Rupestris, Sand grape or Rock grape	I, 1.
V. Vulpina, generally known as V. Riparia	I, 2.
V. Solonis, Sand Beach or Bush grape,	I, 3.
V. Doaniana, Dean's grape	I, 4.
V. Champini, chalky, limestone hills,	III, 8.
V. Candicans, black lands, Mustang grape	III, 9.
V. Labrusca	IV, 11.
V. Bourquiniana	V, b.
V. Lincecumii, Post-oak grape	V, 12.
V. Æstivalis	V, 14.
V. Berlandieri, chalky, limestone hills	VII, 20.
V. Rotundifolia	VIII, 24.

From these species we will always secure our grapes, either in pure or hybrid form, and stocks on which to graft non-resistant kinds, in regions where the Phylloxera devastates the Vinifera varieties. Here it is proper to remark that in nearly all regions of the United States, east of the Rocky Mountains, the *Vinifera* are of little value except in hybridization with our native species above mentioned; of the other species some might also be used to advantage, but they are either too difficult to grow from cuttings, too tender, sensitive to cold, too small and inferior in fruit, not quite resistant to Phylloxera, and some are very subject to fungus diseases.

V. *Rupestris*, V. *Vulpina* (or *Riparia*), V. *Solonis*, and V. *Doaniana* (forming Series I), are leafing out, flowering and ripening very early; are very hardy, enduring severe cold, and the cuttings root with the greatest ease. These species are easily recognized and distinguished from each other by botanical characteristics (which most practical grape-growers are unwilling or unable to study, and which the limited space of this manual would scarcely permit). V. *Rupestris** has a greatly branched shrublike vine, a very short leaf, from base to point, with broad opening (sinus); bears small clusters of small, very tender-skinned berries, very juicy and excessive in dark violet coloring matter. They have a fine vinous taste, with a slight pokeberry flavor. As a direct producer it is too light a cropper to be profitable, but in its hybrid combinations it has given some excellent varieties for wine. Jaeger's No. 70 (now named "Munson") and my seedlings of same ("America" and "Early Wine") are examples of Rupestris hybridized with one of the best of *Lincecumii*, found wild in Southwest Missouri.

Numerous hybrids of this species have been produced by *Mr. Jaeger*, of Neosho, Mo., *Prof. Millardet*, of France, and I am now using them extensively as bases for further improvement in varied hybrid combinations. The species has been extensively and satisfactorily used in France, as a resistant graft-stock for Vinifera varieties. In its wild state V. *Rupestris* grows along the borders and on the beds of gravel drift of small streams, which cease to run most of the summer, but where permanent moisture is found not far below. In upland sandy soils in Northern Texas, where the long drouths dry the land out deeply, vines of this species soon die. Of hundreds of its vines planted by me in such soils, every one died within six years, after having grown very thriftily for four years. Vines of this same kind, both from Southwest Texas and Missouri, were planted in different localities in such soil, with the same result, while in same lands the V. *Lincecumii*, native in such soils, are in most vigorous health, now eight years old. Hybrids of Rupestris and Lincecumii have endured quite well, but during the severest drouths show some weakening. It is remarkable that no form of rot attacks the fruit of Rupestris, and its hybrids have more resisting power than the variety subject to rot with which it may be hybridized.

V. Vulpina, generally known as V. Riparia (figure reduced one-fourth from nature), is a much more rampant climber, with more pendulous habit than Rupestris; the foliage is of a darker, clear, lively green; leaves larger, with much longer, sharper teeth, opening at base much narrower; berries are of about same size, but bearing a dense white bloom on surface when ripe, while Rupestris has little or none. The fruit is generally in

* Fig. 41 of V. Rupestris, from nature, after Munson's collection, reduced.

Fig. 42. VITIS VULPINA, Linnæus. (Fox Grape.)
V. RIPARIA, Michaux. (Riverside Grape.)

larger, more compact clusters, and possessing both more acid and sugar. V. Riparia ranges farthest north of any species, extending to 55° N. latitude, where winter temperature often reaches 40 degrees below zero (F.). It was the first American species used in France as a resistant stock to graft upon, and is still very extensively used there and in other countries (lately also in California) where the Vinifera vines are grown.* Like Rupestris it does best in sandy soils, well drained, yet supplied with permanent moisture. In its hybrids with the larger *Labrusca*, or with *Lincecumii* and *Vinifera* hybrids, using the best varieties as a base, may the best grapes for the extreme Northwest be produced.

V. Solonis is a bushy, upright-growing species, of similar habit and liking with V. *Rupestris*, found along the banks of rivers and in beds of small streams of the Panhandle region of Northwest Texas and the eastern portion of New Mexico. In form of leaf and flavor of fruit it is closely allied to V. *Riparia*. Solonis also suffers greatly from the long drouthy summers of the Southwest, in upland sandy soils, but in bottom lands, or sub-irrigated lands, where alone it occurs natively, it flourishes. It is used to a considerable extent as a graft-stock in Europe. The writer of this has produced a number of hybrids of it with Rupestris, Lincecumii, Elvira, etc., in most of which fine wine properties prevail, it gives great sprightliness in combination with Vinifera and Labrusca-Vinifera combinations.

V. Doaniana is extensively climbing, less branching, with larger, whitish, downy, more lobed leaves, much larger clusters and berries than is *Solonis*. It grows in the regions and localities of the Texas Panhandle country. For a wild grape the fruit is often really good, but the skin possesses some pungency, similar to that in V. *Candicans*. This species is much more deeply penetrating in root and drouth-resisting on upland than either of the previously described. It is capable of making a very fine graft-stock, and is also one of the

(Extract from the Third Edition.)

* Vitis Riparia.—This most widely diffused American species of grape-vines was but imperfectly known up to within a few years, even to botanists, so that they could not clearly distinguish V. *Riparia* from V. *Cordifolia*; and they were generally united under the one designation "Cordifolia" The preceding treatise by Dr. Engelmann has shown their specific difference, but the circumstances whereby this knowledge was acquired are so interesting and instructive that we, who have almost providentially led thereto, deem it our duty to record them.

In the winter of 1875 we received from France an order for several hundred thousand long cuttings, mostly of the "*Taylor*," which variety had been recognized as the best grafting stock among those with which they had experimented. In view of the impossibility to furnish one hundred thousand or more Taylor cuttings (as this variety is, on account of its deficient productiveness, but little cultivated), our G. E. Meissner proposed to send them *wild Riparia* or *Cordifolia* cuttings, which bear the greatest resemblance to the *Taylor*, one of its cultivated varieties, and which we had every reason to believe would prove equally satisfactory, if not more so, as a Phylloxera-resisting grafting stock, for the reconstruction of their devastated vineyards. The success was beyond our most sanguine expectations, and since that time this species was more and more recognized as the great remedy for the Phylloxera-destroyed vineyards of France.

Very large quantities were then ordered from us, and we had to look about for them far and near; nor was it an easy matter to avoid the admixture of Cordifolia, Cinerea, Æstivalis, and other wild grapes, which would not answer.

The careful, observing French vintners to whom these Riparias were so very valuable for their vigorous rapid development in almost every soil, their great adaptability to rooting and grafting, and their perfect immunity from the Phylloxera, soon recognized that the so-called "Riparia or Cordifolia" embraced quite a group of somewhat deviating forms, of larger and smaller foliage, more or less hairy, more or less dark in color of wood, etc. They found, besides, that some cuttings (Cordifolia) would fail to root, though they arrived and were planted in the best condition. This, naturally, led to the study of their botanic character, now so fully established that we can at sight recognize and distinguish the true Riparia from Cordifolia: aye, in the mere cutting, in winter, as well as in the young plant and in the seed.

To Prof. Millardet, of Bordeaux, belongs the honor to have established the character of certain distinction between *Riparia* and *Cordifolia*, which species Michaux had justly separated, but which most later botanists had confounded. (See Vigne Americaine, Oct., 1878.)

Dr. Despetis, who made the *Riparia* a special study, says that he knows 380 varieties or sub-varieties of Riparia; some are tomentous (downy-leaved), others glabrous (smooth-leaved); some have light-red wood, others dark, and some even white (gray) wood. But they all resist everywhere and succeed generally well on limestone hills.

Many a grape-grower will ask: Of what practical importance is it to know the botanic characteristics of any species? The answer is, that it enables us to determine to which species a cultivated variety belongs, and to know thereby, beyond doubt, which qualities, common to all descendants of such species, it will have; what kind of soil or location is most suitable; whether it will easily grow from cuttings, be more or less subject to certain diseases, be more or less hardy, etc.

The *Vitis Riparia* comprise the most healthy and hardy grapes of the North Central States (N. C. S.), formerly designated as the Northwest, extending to the Rocky Mountains of Wyoming, Colorado and New Mexico, and is found equally healthy and more productive at the south, in Arkansas and Texas. Hence we may also judge, from its geographical extension, as to its rare adaptability to various climates.

best bases for hybridization, as it readily endures all hardships of climate and resists the fungus parasites remarkably well. It grows readily from cuttings, resists Phylloxera perfectly, is stocky, and thrives in nearly all soils and situations. So far no hybrids have been artificially produced; the writer now expects to experiment hybridization with some selected vines of Doaniana.

V. Campini is native of the same regions with *V. Monticola* and *V. Berlandieri*, among the cretacious, dry, chalky limestone hills of central Southwest Texas, to the northwestward of Austin, the capital. It is a strong, branching species, with small leaves, very broad opening at base, dark green, thick and leathery, with little cottony down; the cluster and berries are of about same size as in V. Doaniana, but have a distinct pure flavor, vinous, sprightly, with some pungency in the thin, tough skin, possessing intense abundant coloring matter, fitting them well for making superior red wine. This species flowers and ripens early, but the fruit will hang on long after ripening, growing constantly better. Its cuttings grow with greatest ease. It is remarkably deep-rooting and drouth-resisting, a very promising base to hybridize upon. The writer has now fruiting numerous beautiful hybrids of it; they have no musky (foxy) aroma or flavor, and, all in all, furnish good bases upon which to build for future viticulture, especially for the trying, changeable Southwest climate, where so much richness in color, flavor and sugar can be developed. As a graft-stock *Champini* has few equals and no superior. In my experience it takes the graft readily and carries it robustly to a good age.

V. Candicans, the Mustang grape of the black lands, is known to every Texan. The vine grows to enormous size, has a persistent fibrous bark; the leaves are of a somewhat triangular outline, on old vines numerously and deeply lobed, on young vines with broad open bases; when young, both sides are white with a dense cottony wool; at maturity the upper surface of leaves becomes very dark, smooth, shining green, and convex, the borders being reflexed backward, the lower side permanently holds the dense, felty, white layer of wool (tomentum). The clusters are small, forked; the berries large, dull black; skin thick, tough, and of a fiery pungency, so that the chewing of a few skins makes the mouth sore. The berry is very persistent, the pulp tough, slippery, juicy and agreeably sweet, yet deficient in sugar. It would be supposed that such a grape would be of little value in viticulture, yet, in some of its hybrids with Vinifera, produced by that learned botanist and experimenter on grapes, *Prof. A. Millardet*, of Bordeaux, France, and one by the writer, named "Elvicand," in which "Elvira" is hybridized by *Candicans* pollen, we have grapes good in quality and remarkably vigorous. But as cuttings of *Candicans* root with the greatest difficulty, it is not liked as a graft-stock. Considerable quantities of wine are made in Texas from fruit of this species, gathered from wild vines.

V. Labrusca. This species, represented pre-eminently by the Concord, its many seedlings, crosses and hybrids with Vinifera, is so well known that I need not dwell upon it. It is the great market grape east of the Rocky Mountains; but the time is at hand when it will "lift its hat" to others of our native species.*

(Extract from the Third Edition.)

*V. Labrusca, the species of which the largest number of our cultivated varieties and those most extensively cultivated in our country are the offspring, is still the most limited *local* species, its home being confined to the region between the Atlantic Ocean and the Alleghany Mountains, the wild Labrusca being unknown in the Mississippi Valley. "Whatever has been called so there, or in Louisiana or Texas, is a large and downy-leaved form of *Æstivalis*, always readily distinguished by its '*intermittent*' tendrils, while Labrusca has more or less '*continuous*' tendrils.

"For *table* use, this species, in its improved varieties, will probably always occupy a prominent position in a large portion of the Eastern and Northern States.

"As a wine grape the *V. Labrusca* has been over-estimated; the tough, musky pulp of even the best varieties requires a long and favorable season of growth to reduce the acid center so as to produce a proper ratio of the ingredients necessary for a passable quality of wine."—
William Saunders.

The large size of the fruit, the vigor and productiveness of the vine, and its easy propagation from cuttings, made the varieties of this species preferable to others for hybridizing with European grapes; and it was expected to thereby ameliorate, if not to remove, their foxiness. While this improvement in flavor has been thus accomplished, the process has diminished the hardiness and has increased the sensitiveness to climate and to fungoid diseases in the varieties thus produced. It has proven far more successful to grow seedlings from pure Labrusca varieties (though of the hundreds raised from pure Concord seed not one has so far been produced surpassing it), or seedlings from crosses between the coarser and more tender varieties of this species, as the *Niagara* (cross between Concord and Cassady), the *Jefferson* and the *Diamond* (crosses between Concord and Iona). Moreover, the much decried "foxy taste" becomes much less objectionable by habit.

The hardy varieties of the *Labrusca* are also excellent grafting stock for tender, less vigorous varieties, especially for hybrids of the V. Vinifera, being quite resisting to the Phylloxera; but in some localities the *Labrusca* does not feel at home,

Fig. 43.

VITIS LINCECUMII, Post-Oak Grape, Munson. (Jæger's No. 43.)

V. Bourquiniana, best known and represented in the *Herbemont* and Jaquez. They are considered a form of our native *Æstivalis*, styled "Southern Æstivalis," but have been traced to southern France.

They are fully at home in the south, and resist Phylloxera as well as most our native species, their fruit, though small in berry, is of the highest quality; but is very deficient in imparting its fine quality to hybrids.

The Herbemont, known as "Brown French," and Jaquez (Le Noir), known as "Blue French" were brought to Savannah, Ga. (as I am credibly informed), by a Huguenot family by the name of Bourquin, from southern France, over 150 years ago. The vines, sent me by Mr. Gougie Bourquin of Savannah, under these names, are direct descendants from the original vines in the Bourquin gardens and prove beyond question, in several years fruiting on my grounds, that they are identical with Herbemont and Jacquez.

In this blood we have vigor combined with refining power, and it must be even more valuable in hybridization with our natives than the vinifera, especially for the south; for it is a very late ripening species, so that far north they would hardly ripen, but all the more valuable south on account of their lateness. (In the descriptive part of this catalogue the editors continue, however, to classify these varieties as southern Æstivalis).

V. Lincecumii, the Post-oak grape (with portrait from nature ¼ reduced) of the southwest, known also as Turkey grape, and as large-fruited Æstivalis. Hermann Jaeger first brought this species to prominent notice in his "Far West," "Neosho" q. v. No. 13, No. 43, &c., (listed in third edition of this Catalogue, 1883, p. 112); choice finds in the woods of that region. In Texas the fruit of this species grows larger still, often as large as Concords; and from the best finds among tens of thousands of vines diverse hybrids have been produced by the writer with the result that among them the finest quality, greatest vigor and productiveness have been secured; table and wine grapes with large clusters, large berries, persistence and good quality, which promise to succeed over a large area. The Post-oak grape has generally larger berries than the eastern Æstivalis, and these berries are possessed of a peculiar, pronounced fruity flavor, sometimes too strong to be agreeable, known here as Post-oak grape-flavor. This species endures the longest, severest drouths, on our native light sandy uplands with impunity, which few other species can accomplish; and where V. Labrusca, V. Rupestris, V. Riparia and V. Solonis would burn out entirely, the Post-oak would hang full of leaves, yet pliable and lively green, scarcely wilted, by having deeply penetrative, large, firm, branched roots and leaves of firm texture, evaporating little moisture from their surface. The fruit of the best of this species has richness in flavor, sprightliness and sweetness; good size of cluster and berry, persistence to pedicel and keeping qualities which, taken in connection with its characteristics for wine-production, make it probably the most valuable basis for improvement of all our species. I do not consider our best Lincecumii or Post-oak grapes quite good enough for table, but think that in the hands of experimenter and hybridizers, they furnish a most valuable basis for improvement.*

The difficulty with which the cuttings of Post-oak grow, renders its propagation in pure form tedious and slow; but its hybrids with Rupestris, as in Jaeger's No. 70 (now named Munson), and No. 72, and in "America," also in hybrids with Labrusca× Vinifera hybrids, grow generally well from its cuttings.

V. Æstivalis; Summer Grape. In this species we have grapes of high astringent wine properties, generally free from the mildews and rots, as so well illustrated in the Norton. It is unnecessary to give a more detailed description of this species here, as

neither in this country nor in France; it does not thrive well and its fruit is very inclined to rot.

G. Onderdonk writes us: "After all, our grapes in Texas must come from the Æstivalis family; no Labrusca has given us good, permanent satisfaction here." This same view obtained ground in Arkansas and Southwest Missouri, after full trial and dearly bought experience. Herman Jaeger, of Neosho, Southwest Missouri, wrote us: "In Southwest Missouri, Southern Illinois, Arkansas, Western Texas (also in Alabama), the *Labrusca*, or Fox grapes, bring two healthy crops of fine grapes, and the most vigorous varieties a few more; then they rot to such an extent that they are entirely worthless. The *Æstivalis* never rots and is the only truly reliable grape for these States."

*Our friend Munson is now widely known as a successful hybridizer, a creator of new varieties; but little known, however, is the immense activity and loving devotion, the sacrifice of time and money, which this involves. He plants and tests, every year, many thousands of his seedlings, selecting the finest only from them; ever trying new combinations. The varieties listed in this catalogue are the cream from over 40,000 grown; and he says: "If as many as a dozen are permanently retained I shall feel that my work has not been in vain. This may not be encouraging to originators—but it is the road to progress; and by doing this work for years, he knows now better than ever which are congenial combinations and the best specific bases upon which to build.

Fig. 44.

VITIS ÆSTIVALIS. (Summer Grape,) Michaux.

nearly everyone who knows anything of grapes knows the native summer grape.*

* V. ÆSTIVALIS. (See Dr. Engelmann's Classification, page 15 in this edition). While we no longer retain with V. Æstivalis the form distinguished by Buckley, and after him by Munson, as *V. Lincecumii*, we still consider the varieties of the Herbemont and Lenoir class as being comprised in our *Æstivalis* species, its southern group, until the wild plant from which these varieties might have sprung will be definitely known. The following Viticultural remarks from our third edition of this catalogue apply to both its *northern and southern group*:

VITIS ÆSTIVALIS.—This species is preëminently the WINE grape of the South Atlantic States, and of the lower Mississippi Valley and Texas. . . . The berries are destitute of pulp, and the juice contains a larger percentage of sugar than any other improved American species. The foliage is not so liable to disease as that of the fox grape, and in the berries rot is also less prevailing, while in some varieties of this class, as Norton's Virginia and Cynthiana, it is comparatively unknown. Some of the best wines made in this country are produced from varieties of this

family. "I am convinced that neither the wine-producing capabilities of the country nor the highest excellence of the product can be decided until vineyards of these varieties are established in the best locations of favorable climates."—*William Saunders.*

"The most genial home of this species is the country of the Ozark hills, Missouri, S. Kansas, Arkansas, Texas and Indian Territory; probably also the mountain slopes in Virginia, North Carolina and Tennessee. And these must be looked upon as the great producing regions of this continent, east of the Rocky Mountains, for a certain class of *fine wines.*

The varieties of this group generally prefer a dry, poor soil, intermingled with lime and decomposed stones, with a southern and southeastern exposure; they seem to endure the severest drouths without flagging. Although we have seen some of them, especially the *Norton* and *Cynthiana*, bear immense crops on the deep, rich, sandy loam of our river bottom, their fruit does not reach the same perfection as on the hills. The *wood* of the true Æstivalis is very solid, hard, with small pith, and firm outer bark; so that it is almost impossible to propagate this species from cuttings. The bark on the one-year-old wood is of a dark gray color, bluish around the eyes. The *roots* are wiry and tough, with a smooth, hard liber, penetrating deep into the ground, successfully defying the attacks of Phylloxera. Their resistive power has been fully tested, and established beyond a doubt. As a stock for grafting they are far superior to Clinton—but we think they are too good and valuable to serve merely as a grafting stock.

V. Berlandieri; (figured in a photo-engraving, from nature, reduced ¼). This species, owing to its thriving in the dry, limy and chalky soils, where most other species fail, and being fully resistant to Phylloxera, very strong and long lived—makes the most successful graft-stock in such soils, it has proven by actual test to resist chlorosis (yellowing of foliage caused by excess of lime in soil) in the Department of the Herault, France, where the soils are very dry and chalky. The vine is closely allied to *V. Cinerea*, but the leaves have a brighter green and a shining surface, especially below, between the veins. The cluster is large to very large, compact, having small berries of sprightly, sweet, vinous quality, and may, with judicious hybridization, produce valuable varieties for wine.

V. Rotundifolia, V. Vulpina, or Southern Fox grape of Linnæus, the Muscadine grape of the Southern States, represented in cultivation by the *Scuppernong* (the only variety not black in color, which is of a dull greenish amber) *Flowers, James, Mish, Pee Dee, Thomas*, (see their description); it is a sure bearer, provided male, or staminate vines stand in the vicinity of the fertile vines. It is leafing out and flowering late and, as far as known, all fertile vines of the species have practically pistilate flowers, the samens being so weak and reflexed that their pollen is impotent to fertilize the ovules, as is generally the case in varieties of other species having reflexed stamens. The vines of Rotundifolia are uniformly very healthy, resistant to nearly all fungus diseases and the roots to Phylloxera. Those who are accustomed to eating the fruit of this kind relish it.

The idea occurred to the writer that if the finer, large-bunched Herbemont could be successfully hybridized with the best Muscadine-varieties, a combination might be secured which would furnish a unique and desirable family of grapes for the south. Acting upon this idea he is now raising several dozen hybrids of *Scuppernong* and *Tomas* (f) with *Herbemont* (m).

(We confidently hope that friend Munson will be successful, and wish that he may obtain for it such price as his great fellow hybridizer, Luther Burbank, gets for some of his wonderful "new creations.")

LOCATION.

The only general rules we can give to guide in the selection of a proper, desirable location for vineyards, are:

1. A good wine-growing region is one where the season of growth is of sufficient length to ripen to perfection our best wine grapes, exempt from late spring frosts, heavy summer dews, and early frosts in autumn. Do not attempt, therefore, to cultivate the grape in low, damp valleys, along creeks; high tablelands and hillsides, with their dry atmosphere and cool breezes, are preferable to rich bottom lands; low situations, where water can collect and stagnate about the roots, will not answer; wherever we find the ague an habitual guest with the inhabitants, we need not look for healthy grape-vines; but on the hillsides, gentle slopes, along large rivers and lakes, on the bluffs overhanging the banks of our large streams, where the fogs arising from the water give sufficient humidity to the atmosphere, even in the hottest summer days, to refresh the leaf during the night and morning hours, there is the location for the culture of the grape. *Shelter* has also an important bearing on the healthy growth of the vines; some well-located vineyards have not proven lucrative for the want of proper shelter; where it is not afforded by woods growing near by, it should be provided for by planting trees; large trees, however, should not be planted so near the vines as to interfere with their roots. One of our vineyards has been thus protected by an arbor vitæ fence from the north and west winds. This fence is now 30 years old, over 8 feet high, and is considered one of the finest ornaments to our

Fig. 45.

VITIS BERLANDIERI, Planchon. (VITIS MONTICOLA, Engelmann.)

grounds. There are some locations so favored that no artificial protection is needed. Remember, however, that no one locality is suited to all kinds of grapes. (See page 3.)

2. A good soil for the vineyard should be a dry, calcareous loam, sufficiently deep (say 3 feet), loose and friable, draining itself readily. A sandy, yet moderately rich soil is better adapted to most varieties than heavy clay. New soils, both granitic and limestone, made up by nature of decomposed stone and leaf-mould, are to be preferred to those that have long been in cultivation, unless these have been put in clover and rested a few years. If you have such a location and soil, seek no further, ask no chemist to analyze its ingredients, but go at once to

PREPARING THE SOIL.

"The preparation of the soil is undoubtedly one of the most important operations in the establishment of a vineyard, and one of its objects should be to get the soil of a uniform texture and richness throughout, but not over-rich. This deep stirring of the soil puts it very much in the condition of a sponge, which enables it to draw moisture from the soil beneath and from the atmosphere above, and hold it for the wants of the plant; hence, soils that are drained and deeply stirred, keeping the good soil on the surface, are less subject to the evils that accompany and follow a drought than those that are not so treated. It is of the first importance, therefore, that vineyards and orchards at least should be put in the best condition for the reception of the vines and trees, if the best results are aimed at."—
Pet. Henderson.

The old system of *trenching* is no more practiced, except, upon very hard, stony soil, and upon steep hillsides, being too costly and of very little, if of any, advantage. The plow has taken the place of the spade, and has greatly lessened the expense. While we would urge a thorough work in the preparation of the soil before planting the vine, we believe that by careful grubbing (in timber lands), leaving no stumps, which would only be continual eyesores and hindrances to proper cultivation, and then, using a large breaking plow, followed by the subsoil plow, the soil will be stirred as deeply as is really necessary to insure a good and and healthy growth of vines. For old ground a common two-horse plow, with a span of strong horses or cattle, followed in the same furrow by a subsoil stirrer, will be sufficient to stir the soil deeply and thoroughly, and will leave it as mellow and as nearly in its natural position as desirable. This may be done during any time of the year when the ground is open and not too wet. Most soils would be benefited by under-draining; the manner of doing this is the same as for other farm crops, except that for vines the drains should be placed deeper; it is less important on our hillsides, and too costly to be here practiced to a great extent; wet spots, however, must be drained at least by gutters, and, to prevent the ground from washing, small ditches should be made, leading into a main ditch. Steep hillsides, if used at all, should be terraced.

PLANTING.

The soil being thus thoroughly prepared and in good friable condition, you are ready for planting. The proper season for doing this here, is in the fall, after the 1st of November, or in the spring, before the 1st of May. Seasons differ and sometimes make later planting advisable, but never during frost nor while the ground is too wet. If you have been delayed with your work of preparing the soil in spring, the young plants from the nursery should be heled in some cool, dry place and covered, so that their vegetation be retarded; if they have already made shoots, be specially careful to guard against their roots getting dry. Most vineyards are planted in spring; in northern and very cold localities, this may be preferable. *We* prefer fall planting; the ground will generally be in better condition, as we have better weather in the fall, and more time to spare. The ground can settle among the roots in winter; the roots will have healed and calloused over, new rootlets will issue early in spring before the condition of the ground would have permitted planting, and the young plants, commencing to grow as soon as the frost is out of the ground, will start with full vigor in spring. To prevent the roots from being thrown to the surface by alternate freezing and thawing, a mound of earth hoed up around the plants, or a ridge thrown up with a plow so as to elevate the ground somewhat in the rows, will be found to afford all the protection necessary. By no means delay planting till *late* in spring, and, if your ground is not ready in time, you had much better cultivate it with corn or hoed crops of some kind, and postpone planting until next fall. Planting in rows, eight feet apart, is now the usual method; it gives sufficient space for a horse and man to pass through with plow or cultivator; the distance in the rows varies somewhat with the growth of the different varieties and the richness of the soil. Most of our strong vigorous, growers, will need 8 to 10 feet in the rows; while

the Delaware, and other light grapes may have sufficient room when planted 6 feet apart. The dwarfing treatment practiced with European varieties, especially by German vintners, will not do for American vines, which must have ample room to spread and a free circulation of air. The number of vines required to set an acre (containing 43,560 square feet) will be—

Distance, feet.	*Metres.*	*Number.*
6 ft. by 6 ft.	1 m 85 by 1 m 85	1,210
6 ft. by 7 ft.	1 m 85 by 2 m 15	1,037
6 ft. by 8 ft.	1 m 85 by 2 m 46	907
6 ft. by 9 ft.	1 m 85 by 2 m 75	807
6 ft. by 10 ft.	1 m 85 by 3 m	725
7 ft. by 7 ft.	2 m 18 by 2 m 15	889
7 ft. by 8 ft.	2 m 15 by 2 m 46	777
7 ft. by 9 ft.	2 m 15 by 2 m 75	690
7 ft. by 10 ft.	2 m 15 by 3 m	622
8 ft. by 8 ft.	2 m 46 by 2 m 46	680
8 ft. by 9 ft.	2 m 46 by 2 m 75	605
8 ft. by 10 ft.	2 m 46 by 3 m	545
9 ft. by 9 ft.	2 m 75 by 2 m 75	537
9 ft. by 10 ft.	2 m 75 by 3 m	484
10 ft. by 10 ft.	3 m by 3 m	435

One acre = 41 *ares* French measure, or one *hectare* nearly equal to two and a half acres.

Having determined the distance at which you desire to plant the vines, mark off the rows, running them parallel, and with the most level lines of your slope or hillside, so that you may easily plow between the rows and that the ground may not wash. (On an eastern slope the rows will therefore run in a direction from north to south, which most vine-dressers prefer.) Be careful, on sloping ground, to leave spaces for surface drains; the steeper the hillsides the more frequent must these surface drains be. Then divide the rows into the desired distances by the aid of a stretched line, and put small stakes where each plant is to stand. Now, if the ground is sufficiently dry so as to pulverize easily, make the holes to receive the vines. The depth of these holes must necessarily vary somewhat with the nature of the soil. On very steep hillsides, and especially on southern slopes, with naturally warm, dry soil, you must plant deeper than on gentle slopes with deep, rich soil, or on bottom land and rich prairies. Eight inches will be deep enough on the latter; on the former we should plant from twelve to fourteen inches deep.

Having made the holes—and it is best not to make too many at a time, as the ground will dry out too quickly—you can go to planting. In planting it is important to spread the roots carefully, and to have them each and all firmly surrounded with good fine soil, pressing it down with the hands or foot; then fill up the hole with earth, forming a very small mound, leaving one or two eyes exposed.

Every beginner in *Grape* culture knows that young rooted vines are used for planting, whether it be for whole vineyards or merely for the garden or arbor, and that such young vines are usually raised in the nursery from cuttings or layers. But the reason why they are *not* grown from seeds is not generally so well known, and even among old experienced grape-growers some erroneous ideas prevail with regard to seed culture and questions connected with this, now more than ever important and interesting subject. It is scarcely necessary to mention that the wild grape grows and propagates itself from seed only. This wild grape generally reproduces itself; i. e., its seedlings do not materially differ from their parent vines. Transplanted into richer soil, and receiving care and cultivation, its berries may increase in size, and in the course of years may somewhat improve and change its character; if, then, we take the seed of this cultivated vine, especially if it was grown in proximity to other different grapes, the seedlings of these will more materially differ. So great is this tendency to variation, that of a hundred seedlings of one cultivated vine scarcely two will be found exactly alike; some will differ widely; nearly one-half will be male plants and will not produce any fruit at all, while most of the others will retrograde to their wild origin, and scarcely one, perhaps, be an improvement on the cultivated parent.

The layer or the cutting of a grape-vine will, on the contrary, exactly reproduce the parent vine from which it was taken, and even any transplanting of the same, into a widely different locality, cannot change it. The differences in soil and climate may *improve* or *impair* the vigor of the vine and its foliage, the size and quality of its fruit; in other words, they may be more or less favorable to the development of its inherent qualities, to the good or ill success of the variety; but they will never materially change it in appearance, form, taste, color—much less in its botanical characteristics.* The

* The erroneous opinion that a grape transplanted to other countries may become entirely changed by influences of climate and soil was often supported by errors or deceptions in transplanting a vine or cutting, not true to name. Thus the famous Tokay grape was supposed to have been transplanted to the Rhine 150 years ago, and, as it was there found to be a miserable grape, quite different from the noble Tokay, this was ascribed to the influence of the different soil. But lately it has been discovered that the grape transplanted from Tokay (in Hungary), and known in Germany under the nickname "*Putzschere*" (Snuffers), is the same grape which also grows at Tokay and is known there under the name "*Gyönyszölo*" (white pearl), and that it is there also of poor quality, and is *not* the excellent variety "*Frumint*" of which the celebrated Tokay wine is made.

practical grape-grower, therefore, who desires to plant certain varieties, all fruit-bearing, will not plant seeds, nor young plants raised from seeds—although some theorists pretend that the long continued propagation and culture of the grape from the wood was the cause of its recent failures to withstand diseases, insects, and other parasites. Careful and unprejudiced investigation and reasoning as well as practical experiments have fully established the facts: that seedlings resist no more successfully than plants from cuttings, nor are they much less sensitive to the vicissitudes of climate; and that the long continued culture and propagation from wood has nothing to do with the greater or less resistance to disease, nor has their cellular tissue been softened thereby.

For practical grape culture we should use none but the best rooted plants of those kinds which we wish to produce. Some vintners, from supposed economy, use only cuttings to plant their vineyards, placing two cuttings where one vine is to grow; but the result generally is unsatisfactory, especially with American varieties, most of which do not root as easily as those of the European Vinifera class, and make much replanting necessary; and where both cuttings do grow, one must be pulled out. Those vintners would do better, by far, by first growing their cuttings one or two years in nursery rows, and afterwards transplanting the best of them to their intended vineyard.

But if we desire to obtain NEW varieties we must plant seed. This is a far more uncertain, slow and difficult operation than most people imagine, and but very few have been successful in it. Just as some careful breeders of animals have succeeded in raising improved kinds, on which they engrafted certain qualities by crossing, so have horticulturists endeavored to reach the same end by hybridizing the best varieties of grapes and planting their seeds, having due regard to the characteristics of the parents from which they breed.

But of late still another very important function has been assigned to seed planting, namely, to produce in Europe (especially where the importation of our cuttings and rooted plants has been prohibited) American vines, which resist the Phylloxera, as grafting stocks. For, however great the tendency to variation is in seedlings, still, under all circumstances and changes of soil and climate, they retain the Phylloxera-resisting root as well as other botanical characteristics of their parents.* During the last years we have furnished several thousands of pounds of grape-seed to Austria, Italy, Spain, and Portugal. The reports of their germination were generally favorable. The following report of v. Babo, kindly furnished us in spring 1883 is certainly both reliable and interesting in this respect: "Of the grape-seeds received from you last year, the *Riparia* sprouted best; so well, indeed, that we can scarcely manage the innumerable small seedlings. All the other seedlings (from cultivated sorts) show great variety in fruit, color, foliage, &c. Most variable are those from *Taylor* seed; from the 2,500 bearing vines raised from seed of this one variety, a hundred distinct sorts can easily be selected. The young plants from Riparia seed seem not to vary much, as we can find but very little essential difference in their foliage."

We do not intend here to discuss the various modes of multiplication or propagation of grape-vines from cuttings, layers or single eyes (buds), still less the methods of producing new varieties from seed and of hybridizing, as this would far exceed the scope of this brief manual, nor do we desire to say whether plants grown from cuttings, from single eyes or from layers, are preferable. Propagators and nurserymen are not considered disinterested, impartial judges on this question. But we may say without fear of contradiction that for success in grape growing it is of first importance to get *the best plants.* Vines raised from layers were in former years held to be superior, and are still preferred by many, but unprejudiced and observing cultivators have found that they only *look* stronger and finer, but are *not as good* as plants properly grown from cuttings or single-eyes, of mature, healthy wood.

Our German and French vine-dressers generally practiced growing vines from *long* cuttings, but short (two or three eye) cuttings will usually make stronger and better ripened roots. Others again have obtained the best results from single-eye plants, and consequently prefer them. The celebrated French ampelograph Dr. Jules Guyot praised single-eye cuttings as physically and physiologically most approaching to those raised from seed. We have tried all, and find that it makes very little difference how the vine has been produced and raised, provided it has strong, firm, healthy, well-ripened roots, and wood, with plump and perfect buds. As a general rule, a *well grown vine* is in its best condition for pla ting when *one* year old. Fuller and many other good authorities prefer two-year old transplanted vines; vines older than two years should not be planted, and

* For this purpose it is best to use the seed of the wild grape, especially of *Æstivalis* and of *Riparia;* the seed of *hybrids* should not be used.

so-called extra large layers "for immediate bearing" are a humbug.

There is, however, one method of propagating the grape, namely, by GRAFTS, which belongs more properly to the sphere of the cultivator, the vineyardist, than the nurseryman or propagator, and which presents itself under aspects almost entirely new.

GRAFTING.

Grafting the grape-vine is now practiced on a gigantic scale in Europe, where the continued inroads of the Phylloxera have carried devastation and destruction over an immense area of vineyards, once thrifty and blooming. Many methods have been tried; untold sums of money have been expended in vain attempts to check the march of this terrible enemy of the European grape; but, alas! these attempts have practically proved to be failures. By the application and continued use of chemical insecticides some vineyards have been kept up in a state of comparative health and productiveness; but, unfortunately, the cost of these annual applications is to high for general use, and can only be afforded by the proprietors of the most renowned vineyards, the "grand crus," whose products command such extraordinary prices as to cover the extraordinary expenses of preserving them by this means. Vineyards which can be entirely submerged in water every winter, for a period of at least fifty days, can also be maintained in spite of the Phylloxera. And, finally, vines planted in soil containing at least 60 per cent. of pure sand (silica) offer also a comparative resistance to the insect.

These three means of maintaining the European grape in spite of the Phylloxera apply themselves only in such exceptional cases. however, that European grape culture would be doomed to an almost entire destruction were it not for the American vine coming to the aid of its European sister. The American vine, with its strong, robust system, and its tough, vigorous root, resists the Phylloxera, and by lending its root to the European vine makes the reconstruction of the devastated vineyards possible.

When the second edition of our catalogue was published (1875) this matter was still a problem, and many then doubted whether the solution, positively and practically, would be a satisfactory one. This problem has been solved, and it is placed beyond all doubt that the use of the American resistant vine as a *grafting stock* for the European grape (V. Vinifera) is the true solution of the Phylloxera question for the European vintner—that solution which alone has been found generally applicable, generally practical, and generally satisfactory.

Millions of vines are now grafted in Europe every spring, some on simple cuttings, some on nursery plants, and others in vineyard plantations; but in all cases the grafting stock is of American descent. The stocks most generally employed for this purpose are types of our wild *Vitis Riparia*, which probably constitutes four-fifths of the grafting stocks employed, having been found to adapt themselves to nearly all kinds of soils and exposures, and uniting the greatest powers of resistance to the insect with a remarkable facility of rooting from cuttings and of receiving the graft of the V. Vinifera.

We will be pardoned for mentioning here with a certain degree of pride and satisfaction, that we were the *first* to recommend and to bring this valuable grafting stock to the notice of the French grape-growers (in Dec., 1875) and to place it in their hands in sufficient quantities to test its merits, which merits they soon learned to appreciate. Since then the French vintners have propagated and increased the stock in a wonderful degree, the single Department of Herault alone furnished many millions of plants and cuttings of *Riparia*, all to be grafted with the European grape.

The results obtained by grafting the V. *Vinifera* on American roots have generally been found so satisfactory, not only as the means of resisting the Phylloxera, but also as imparting greater vigor and productiveness to the European grape, that the practice of grafting on American stocks would probably be continued even if the dreaded Phylloxera were to suddenly and entirely disappear. Unfortunately, the very reverse, the increase and spread of the insect, is far more probable; and the sooner those grape-growers of southern Europe whose territory is not yet infested by this scourge reconcile themselves to the idea of reconstructing their precious but doomed vineyards by the means of grafting on American Phylloxera-resisting stocks, the better it will be for them.

Since the foregoing, from our last edition was written, more than ten years have elapsed and the experience of the present day finds the expectations then expressed fully verified. Thousands, yes, hundred thousands of acres of Phylloxera destroyed vineyards have been reconstituted by grafting on American roots, and are to-day again in full vigor and productiveness. The great grape industry of southern Europe which twenty years ago was threatened almost to destruction has not only recovered, but is again, as of yore, a most important factor in the

national wealth and prosperity of that part of the world.

We hope our American readers will excuse these rather lengthy remarks about "grafting in Europe;" but some of them, especially our friends in California, where the European grape forms the main basis of grape culture, will find them of some practical interest.

The question of grafting the grape-vine has many other points of interest for us, aside from the object of placing a variety which is subject to the Phylloxera beyond the pernicious influence of this insect. Thus another object for which grafting is very desirable is the early testing of new varieties. By grafting on a vigorously bearing vine we will generally obtain bearing wood, and sometimes even fruit, the first season. We are also enabled, by grafting, to turn old vigorous vines of perhaps some worthless variety to good account, as with a little trouble and care and the loss of only one year we can change them into some choice and valuable variety. Before we enter into the details of the *modus operandi* of grafting, we will first speak of the conditions generally considered essential to the successful performance of the operation.

First. The Stock. Judging from our own experience, we cannot side with those who claim that in all cases the stock and scion should belong to the same class in order to insure perfect success.

A point which is of far more importance is the perfect health and vigor of the stock. We should never select a sickly or diseased vine, nor one subject to the attacks of the Phylloxera, as a stock to graft upon. Even if the graft should live it will thrive but poorly, unless indeed it belongs to some very vigorous variety and is grafted deeply enough below the surface to form its own roots; these will then support it entirely, and it will soon dissolve its union with the unhealthy stock. But even in this case it will require years to overcome the effects of the uncongenial partnership. If the object in grafting is to guard a variety subject to the Phylloxera against the ravages of this insect, we should select for the stock a vine of a strong and vigorous variety, which possesses recognized powers of resistance to the insect. The graft should then be inserted as near the surface of the ground as possible, and, where practicable, even above it. Some have asserted that the stock and scion should be of varieties as near alike in vigor of growth as possible, but with this we cannot agree. We should invariably prefer to graft a weak grower on a strong one.

Second. The Scion. This should come from a healthy and short-jointed cane of last summer's growth and of moderate size, (a little stouter than an ordinary lead pencil is the thickness that we prefer). It should be cut from the vine before very hard-freezing weather and kept in a cool cellar, either in damp moss, sand or sawdust, or buried in the ground. In case the grafting is to be performed *late* in spring, the scion may be kept dormant in an ice house.

In his anotations to the French translator of our last edition, Mr. Champin remarks: "Grafts and cuttings may be preserved indefinitely provided they are protected entirely from air, heat, and especially from humidity. The eyes or buds are quite similar to grains of seed; so long as heat or moisture have not caused them to sprout, they preserve their faculties of vegetation." "By placing or stratifying the grape canes in dry, fine sand, and in a cold dry place, they will keep as fresh as on the day they were cut, not only for a season, but from one season to the next. I have grafted on the 25th of May, 1884, scions which were cut and stratified since the month of December, 1882. and a large number have taken and grown perfectly."

Third. When to Graft. The best time, as far as days and months are concerned, varies, of course, with the locality and latitude; but, as a rule, we would state that the vine cannot be grafted with good success, either while the sap is running so freely as to cause the vine when cut to bleed heavily, as it is termed,* nor yet (except by the process of inarching, of which hereafter) from the time in the spring. or rather in the early summer, when the young shoots begin to turn hard and fibrous; this period generally commences about the time of the bloom and lasts until after the fall of the leaf. This reduces the time for successful grafting to two periods, the first one lying between the fall of the leaf and the rising of active circulation in the spring, and the second one commencing after this exceedingly strong flow of sap has abated and lasting until the full development of the first young growth.

In the more southern States grafting may be successfully and practically performed during the first period. In fact, the late Dr. A. P. Wylie of Chester, S. C., considered the fall or early winter in that latitude as the

*Mr. Champin says: "Even at the period when the vine bleeds most profusely under the cut of the knife, and when the flow of the liquid would threaten to drown or carry off the scion, one can graft with every chance of success under the following precaution: Cut off the vine to be grafted on a little above the point where the grape is to be inserted and wait until the fountain has ceased running; this flow of sap will cease in a few days,—sometimes it will take several days. When it has stopped freshen the cut a little below the previous one, and one can fit the scion with all confidence of success to the stock thus prepared.

proper time for grafting. Farther north, and even in the latitude of St. Louis, fall grafting is not quite as certain, for even when protected by a mulch of straw or leaves the graft is in danger of being thrown out by the heaving of the ground caused by the frost. In this latitude, however, we often have fine days in February and early in March, when the ground is open and before the active flow of sap has commenced, which should be improved for the operation. Still farther north, where the ground opens late and spring comes in abruptly, these days are generally so few that they can seldom be utilized. For these northern latitudes the best opportunity lies in the second period, or during the time in which the sap has ceased its active flow and exudes from the wound in a gummy state. Some even claim good success in mid-summer with scions of the same season's growth.

In describing the operation proper, of grafting in the several different methods, we do not think that we could give better directions than by following largely an excellent French work, "*Traité théorique et pratique du Greffage de la Vigne*," by AIMÉ CHAMPIN, an eminent and most intelligent practical vineyardist, and a most spirited and elegant writer, who has treated the subject in an exhaustive work. His book has also been translated into the German language by Dr. ROESLER. ("Der Weinbau, seine Cultur und Veredlung, von Aimé Champin. A. Hartleben & Co.: Wien, 1882.") To Mr. Champin we are also indebted for the cuts relating to grafting.

Fig. 46.

The method of grafting most generally applied for larger stocks, or for plants which are already established in the open ground, is "CLEFT GRAFTING." After clearing away the soil around the collar of the stock to be operated upon, to the depth of 3 or 4 inches, select a place below the surface with a smooth exterior around the collar; just above this place cut the vine off horizontally with a fine-toothed saw, or, in the case of smaller stocks, with a sharp knife; then split the stock with a common grafting chisel, or other sharp instrument, so that the cleft will run down about 1½ or 2 inches. Insert the small end of the grafting chisel (C), or a narrow wedge, in the centre of the cleft in order to keep it open, and then with a very sharp knife cut your scion—which may be 3 to 4 inches long and have one or two eyes—to a long wedge-shape at the lower end, so as to fit the cleft, leaving the outer side a trifle thicker than the inner one; insert it in the cleft so that the inner bark of both stock and scion may as much as possible make a close fit on each other; then withdraw the wedge in the center, and the scion will be held firmly in its place by the pressure of the stock. If the stock is a large one two scions may be inserted, one on each side. This mode of grafting answers for stocks varying from one-half to three inches in diameter. (See Figs. 46 and 47.)

Though not absolutely necessary with large stocks, it is best to wind the grafted plant tightly with some strong coarse string, or other suitable material, in order to bind stock and graft together. Then cover it with a grafting-clay; this clay is best made by thoroughly mixing one part fresh cowdung with four parts of ordinary tenacious clay.

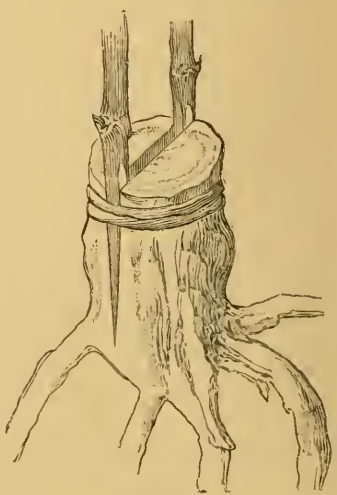

Fig. 47.

Grafting-wax, such as is generally used for tree and other grafting, cannot be recommended for the grape, as the tallow and rosin seem to have a deleterious influence.

To complete the operation, replace the soil, filling it up so that the upper bud on the scion will be level with the surface. A shade placed so as to protect it from the noonday sun, or a slight mulch, is very desirable.

This method of grafting may also be employed for small stocks; when the stock is nearly the same size as the scion a perfect contact of the bark (liber) can be obtained on both sides. (See Fig. 48.)

Or two scions may also be inserted in a stock of a little larger size (see Fig. 49).

It can also be employed for grafting cutting on cuttings (as figured in Fig. 50), though for this, and in fact for all small stocks grafted out of the ground, we would prefer the WHIP-GRAFT, or, better yet, the "CHAMPIN-GRAFT," of which we will speak later.

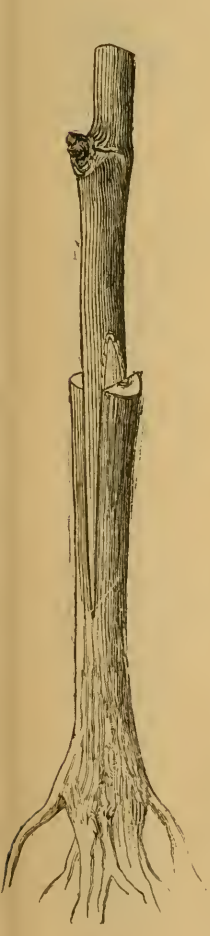

Fig. 48.

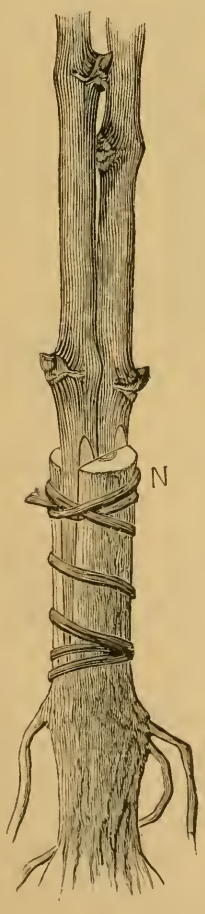

Fig. 49.

Fig. 50.

Another mode of cleft-grafting, which though a little more tedious, is perhaps also that much more certain, is to *saw* a slit in the stock about one and a half inches deep with a thick-bladed or wide-set saw, instead of using the chisel. The cleft thus made must be spread open just sufficiently to receive the scion, which must be cut to fit nicely in the slit, with its upper portion resting, with a square shoulder each side, on the stock. In this instance we prefer to graft with two buds, the lower one of which should be the point where to cut the shoulders. In other respects the same rules apply to this mode as those given before. The greatest advantage is that we can always make a clean, straight cleft, even when the stock is gnarly or twisted.

As the slit cut by the saw is always of a uniform thickness, the scions may be prepared beforehand in the house during a rainy day or in the evening, and kept in damp moss until wanted.

When grafting European grapes (Vinifera) on American stock, to protect them from the Phylloxera, it is important and essential to guard against the graft of the Vinifera making its own roots and finally severing its connection with the resistant stock,—a danger which must be guarded against. To obviate this the European graft should be placed as near the level of the soil as possible, preferably rather a little above than below. If placed above the level of the ground it will be necessary, however, for the first season, or until a perfect cohesion, healing over and growth has taken place, to protect the graft from the drying influence of the air, by a firm, well-made mound of earth placed around it, and made high enough to extend to the upper bud of the graft, even slightly covering the same. In a region where the winters are not so severe as to endanger the life of the European grape, this mound may be gradually removed entirely, in others it should be carefully examined from time to time, and any roots having formed from the graft should be cut off and removed.

We spoke before of the "WHIP-GRAFT" and the "CHAMPIN-GRAFT" as being preferable for small stocks or for cuttings grafted upon cuttings. The ordinary whip-graft (the *greffe anglaise* of the French) is well known to our horticulturists, and, probably, to most of our readers; it is this graft which is most generally employed by our nurserymen in the propagation of all small fruit trees, in making root-grafts, and it is especially convenient for grafting in-doors, for the "graft on the table" or for the "gratt by the hearth-stone," as the French designate it.

In France millions of this grape-graft are

made every winter, mostly on rooted plants of one year's growth, but very many also on simple cuttings of Phylloxera-resisting varieties.

The stocks and scions should both be provided in good season and kept well preserved in sand, sawdust, moss, or other suitable material, and stowed away in a convenient place in the cellar. For this method of grafting it is very desirable, though not really essential, that the stock and scion should be as nearly as possible of a uniform size. The ordinary whip-graft, as employed for the grape, is best explained by the accompanying Figs. 51 and 52.

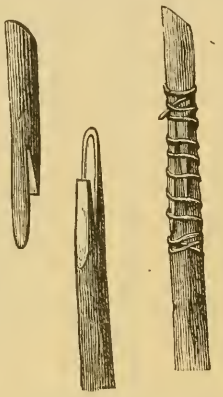

Fig. 51. Fig. 52.

The improved whip-grafting, or the "Champin-graft" (*la greffe Champin*), we will describe by a free translation of that chapter of his book treating thereon:

Let us operate first on a rooted plant or a rooted internode; with the pruning shears, or, better still, with the knife, cut off the top as close as possible below an eye or joint at the collar. After the top has been taken off there remains but little difference between a plant and a rooted joint.* With a coarse rag wipe off all sand and grit from that portion of the shoot to be grafted. Then with a grafting-knife, which should be simple and strong, with a very thin, but wide and not too long blade (see Fig. 53), make a nice, straight and

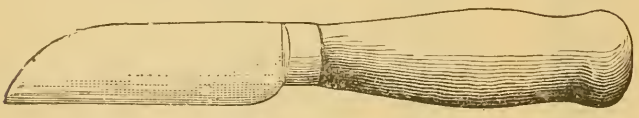

Fig. 53.

regular slit or cleft, from above downwards, and at one-third or one-fourth of the diameter ($1\frac{1}{4}$ to $2\frac{1}{2}$ inches in length), according to the size of the subject (Fig. 54). Then, holding the stock in your left hand in the manner shown in Fig. 55, with the palm of the hand turned up, cut the thickest part of the split end to an exact smooth bevel, of equal length as the cleft, as shown in Fig. 56.

* By "rooted joints" (merithalle raciné) Mr. Champin designates portions of a cane, layered the previous summer, which has sent out roots from its different eyes or nodes. For grafting purposes, it will be seen, these rooted internodes answer all purposes if they have good strong roots, even though no top growth has pushed from the eyes which were buried in the ground.

Fig. 54.

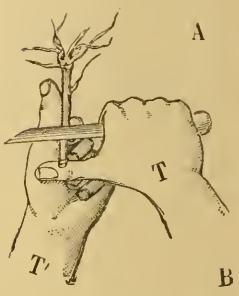

Fig. 55.

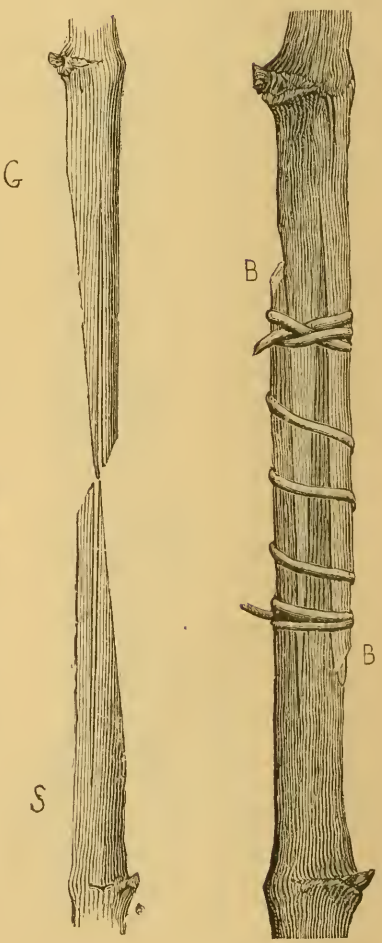

Fig. 56. Fig. 57.

This operation is not at all difficult; but, in order to perform it easily, it requires a very sharp knife, ground to a fine edge from the upper side only.

The graft or scion, which should be selected as nearly as possible corresponding in size or thickness with the stock, and generally with two eyes, is prepared, split and cut precisely in the same manner as the stock, except only, of course, that the cleft and tongue will be at the lower extremity instead of at the upper. (See G. Fig. 56.)

In later practice Mr. Champin found it more expedient to reduce somewhat the length of the cuts for the clefts and the tongues of the stock and scion, making their length about equal to three times their diameter.

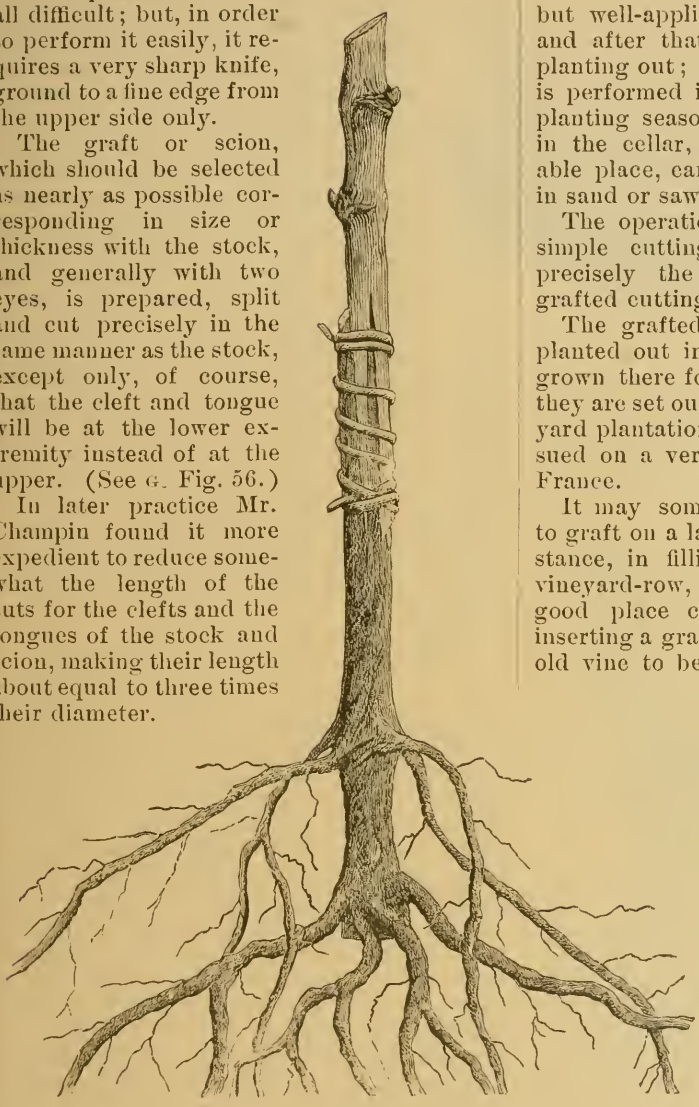

Fig. 58.

Having thus prepared both stock and scion, it is a very easy matter to unite and adjust them, as shown by Fig. 57, taking care that the bark of both fit together exactly and snugly, at least on one side.

The graft is now ready for the tie, which should be of some strong, pliable material. Linden-bass is very good, but any small, strong twine will answer. In France, "Raphia," the product of a palm leaf, is used very extensively for this purpose. The tie should be adjusted firmly.

Fig. 58 shows a well-made "Champin-graft."

It now remains to be covered with a thin but well-applied coating of grafting clay,* and after that will be ready for planting out; or, if the operation is performed in winter, before the planting season, it may be stored in the cellar, or some other suitable place, carefully packed away in sand or sawdust.

The operation of grafting upon simple cuttings is performed in precisely the same manner. A grafted cutting is shown in Fig. 59.

The grafted cutting should be planted out in nursery rows and grown there for one season before they are set out for permanent vineyard plantation. This plan is pursued on a very extensive scale in France.

It may sometimes be desirable to graft on a layered cane; for instance, in filling a vacancy in a vineyard-row, or in cases where no good place can be obtained for inserting a graft at the collar of an old vine to be operated upon; in such cases a thrifty young cane is grafted at some desirable point near its end. The graft may be either an ordinary cleft-graft, a common whip-graft, or a Champin-graft, or, as the illustration (Fig. 60) shows, a saddle-graft. The saddle-graft is nothing else than an inverted cleft-graft, the cleft being made in the scion, while the tongue or wedge is cut on the stock. Fig. 60 shows the layered cane and graft, and will make the operation plain to the reader. One great advantage of grafting a layered cane is that the stock is not sacrificed in case the graft should

Fig. 59.

* A narrow strip of tin-foil, wound around the graft, makes an excellent substitute for grafting clay or wax. If well put on, it will exclude all air and moisture. Of late years bottle-corks, split from the side to the center and the latter slightly hollowed out, to admit the graft, have come into use. The cork is slipped over the graft and then firmly tied with a couple of light iron wires, thus answering the purposes of both clay and tie. While we have no personal experience with this method, nor any direct reports on its results, it seems to us that it should be very successful, when used for grafting on small rooted stocks or cuttings. The corks all ready prepared are extensively advertised in French Viticultural papers.

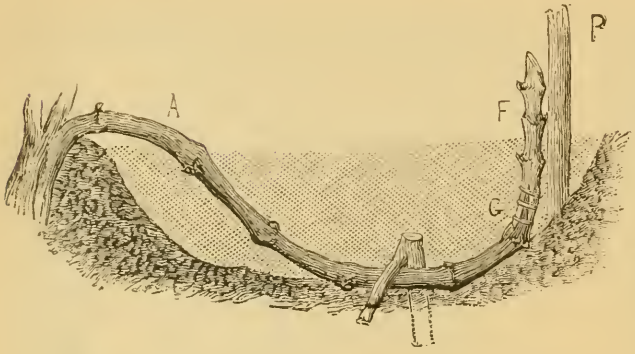

Fig. 60.

fail to grow; it also enables us to obtain a number of such grafts from one vine. In this case the layered canes should be separated from the parent stocks in the latter part of summer, and may be taken up in the fall like any other ordinary layers.

When the object of grafting is to place a European variety or a hybrid, subject to the attacks of the Phylloxera, beyond reach of harm by the insect, it is very important to place the graft as near the surface of the soil as possible, so as to prevent the scion from making its own roots. During the first summer, the grafts should be carefully examined about once a month, and any roots which may have formed from the scion should be cut off. Where the scion is itself of a Phylloxera-resisting variety, this precaution is, of course, unnecessary.

It frequently happens that the buds of the grafts swell rapidly within a few days after the operation, and then, after having given great promise for a week or two, they turn brown and apparently die off. Do not let this discourage you too quickly, and above all make no rash examinations of the cause of this seeming failure, by pulling out the scion or otherwise loosening it. A graft will often remain in this state for a period of five or six weeks, and then start up all at once with a vigor that will push young wood to the length of twenty or more feet the same season. Keep the young growth well tied up, and carefully remove all suckers from the parent stock as soon as they appear.

A method of "Green or Herbacious grafting," which is said to give excellent results, and is extensively practiced in some parts of Hungary, especially in the grape regions around Buda-Pesth, is described in the *Ampelographische Berichte* as follows: "In the month of May, when the young shoots have not yet become woody, but have already well-developed eyes at the base of the leaf, the shoot which is to be grafted is cut off close below an eye; it is then split nearly up to the eye below the cut. The scion, which has been taken from a suitable young shoot, is cut to one eye with a long, thin wedge, below which it is fitted nicely into the split. The graft is then wrapped with woolen yarn. After a few days the eye will begin to swell and grow, and after a complete union has taken place will develop shoots of a yard (over 90 centim.) or more in length, the same season. During the first winter the grafted canes should be laid down and covered, to protect them from injury by frost. The advantages of this method of grafting are, that fruit may often be obtained the first season, that several grafts can be made on the same stock, and that the operation is a very easy one; a skilled hand can easily graft one hundred and fifty or more in a day; and that it is performed at a time when other work in the vineyard is, comparatively, not very pressing."

Another method of grafting, above the ground, is by

GRAFTING BY APPROACH OR INARCHING.

For this method it is desirable that two plants, one each of the variety which is to form the stock, and one of the scion, are planted close together, say about one foot apart. In June (the first year, if the plants make a sufficiently strong growth, if not, the second year), or as soon as the young shoots become sufficiently hard and woody to bear the knife, a shoot is taken from both the stock and the scion vine, and at a convenient place, where they may be brought in contact, a shaving is taken out from each of these, on the side next to the other, for a length of two or three inches. This must be done with a smooth cut of a sharp knife, a little deeper than the inner bark, so as to obtain on each a flat surface. They are then fitted snugly together, so that the inner bark joins as much as possible, and are wrapped securely with some old calico strips, or with soft bass strings. Besides this, it is well to place one tie a little below, and one above the grafted point, and also to tie the united canes to a stake or trellis to insure against all chances of loosening by the swaying of the wind. The rapid swelling of the young growth at this period of the year makes it desirable that the grafts be looked over after a few weeks, replacing such ties which may have burst, and loosening others which may bind so as to cut into the wood. A union will generally be made in the course of two or three weeks, which will be further consoli-

dated in the course of six to eight weeks, when the bandages may be removed and the grafted portion left exposed to the sun, to thoroughly harden and ripen it. The shoots themselves are to be left to grow undisturbed for the rest of the season. In the fall, if a good union has taken place, the cane forming the scion is cut close *below* its union with the stock cane, which in its turn is cut close *above* the connection. Supposing the stock to have been a Concord and scion a Delaware, we now have a vine of the latter entirely on the strong, vigorous root of the former. Of course constant vigilance must be exercised to prevent suckers from starting out of the stock. It is well to protect the grafted joint the first few winters by a slight covering of straw or soil to prevent the frost from spliting it apart.

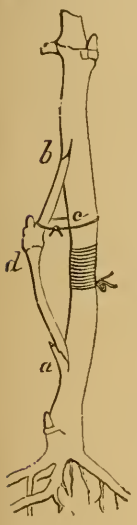

Fig. 61.

Another mode of grafting above ground (copied from "The Gardner's Monthly" by W. C. Strong in his valuable work, "The Cultivation of the Grape") is not merely interesting in itself, but also illustrative of many other modifications in grafting: (See Fig. 61.)

"After the first four or five leaves are formed, and the sap is flowing, you choose the place on the vine where you intend to graft. At that point wrap a twine tightly several times around the vine. This will, in a measure, prevent the return sap.

Below the ligature make a sloping cut down, as shown at *a;* also, a similar reversed one above the ligature, as at *b*, about one inch in length. In selecting a scion prefer one that has naturally a bend. Cut it so that it shall be wedge-shape at both ends, and a little longer than the distance between the cuts in the vine at *a* and *b*. Insert the scion, taking care to have the barks in direct contact, securing it with a string, *c*, bound round both scion and vine sufficiently tight to force the scion-ends into their places. If the work is done well, no tie will be required at *a* and *b*, but the joints should be covered with grafting wax. In a short time, the bud at *d* will commence its growth, after which you can, by degrees, remove all the growing shoots not belonging to the scion, and in course of the summer you may cut off the wood above *b*, and in the fall remove all above *a* on the stock and above *c* on the scion."

In "Orchard and Garden" (Feb., 1891), that veteran Missouri-Kansas viticulturist, Dr. J. Stayman of Leavenworth, gives an article on grafting the grape, from which we make the following extract, as his method of preparing the stock differs materially from the cleft-grafting which we have before described and the Doctor has been so very successful in his grafting operations that his method should be widely known. Dr. Stayman insists upon selecting scions at least 6 to 8 inches long and not less than two buds, which can best be fitted to the stock to be operated on. He then says: "For grafting grapes the tools required are a good, sharp shoemaker's knife, a light mallet, fine saw, pruning shears and a ball of grocer's wrapping twine. We put all these into a basket and wrap the graft-wood in a damp sack, and go to work."

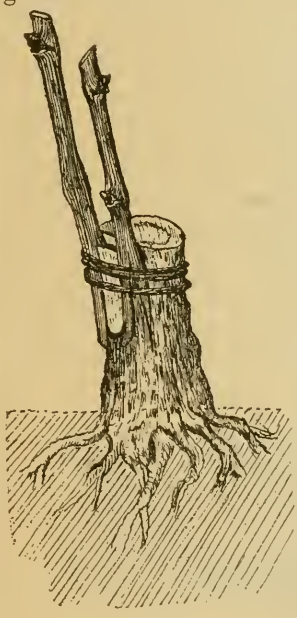
Fig. 62.

We employ a person to go ahead and dig out with a spade the ground all around the vines, down to a point below the first tier of roots, say 8 inches deep. In spading down no attention is paid to the surface roots as they must all be cut away to get down to a clean stock to graft.

This assistant must not go too far ahead of the grafter, as the stocks should not be too long exposed to the sun in that open condition. If the stock is not more than half or three quarters of an inch through: cut it off with the pruning shears, but if larger, saw it off about six or seven inches below the surface. Take off the outside bark,* (Fig. 62) select the most favorable side and cut a slope on the side about one inch and a half long, and about one-fourth of an inch deep at the

* The Doctor lays great stress upon the removal of the outside bark of the stocks in all his grafting. He says: "*We take the bark off the stock* in grafting, not only for the purpose of seeing that the grafts fit and that they are properly adjusted, but also that the damp soil may come in contact with the inner bark so that callus may form soon, as well as keep the grafts alive until united, or roots are thrown out to support it."

"Care should be used, however, not to cut or scrape into the inner or live green bark which is firmly united to the wood. Remove only the dead outer bark which separates freely from the other."

top. The length and the depth of this slope depends to some extent upon the size of the stock. Set the knife about one-eighth of an inch from the top of the slope, and drive it down with the mallet about one inch and a quarter or more deep, to form a tongue in the stock. The knife must be set exactly, or it will cut too shallow or too deep, but a little practice will soon determine this matter. If it is cut too deep the tongue will be too stiff and unyielding, and if too shallow it will be too flimsy to hold the graft.

If the stock is, say three-quarters of an inch or more in diameter, insert two grafts, one on each side, but if less, one stout graft will be sufficient. Cut the grafts long enough that the upper bud will be just about above the level of the ground, or a little above, but never under the surface. Slope the grafts on one side only, about one inch and a half long, to a thin edge below. Take the outside bark off from the graft up as high as the slope. Then cut a tongue in the graft (just like the scions of root-grafted apples are cut), about one inch and a quarter deep. In cutting the tongue, the outside of it should be a little larger than the inside, to make a neat fit. When inserting the grafts they cannot be made to match the stock at every part of the slope, in fact, pay no attention to that; but find the place where they do and push them down *tight* and *firm*. Then as a precaution against moving, wrap a tie around to keep the grafts in place while working about them.

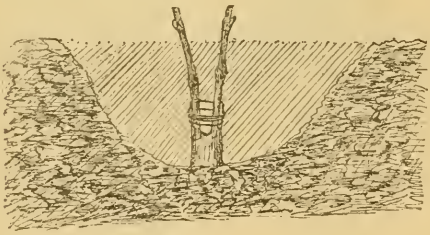

Fig. 63. Stock and Graft Below Ground.

First fill in a little good soil below and pack it down firmly around the graft with the hands. Then fill in about half full and tramp carefully around the graft to make it firm. Then fill up level with the surface, and put a stake to mark the place as well as to tie the grafts to when they grow.

We refrain from speaking of other methods of grafting, as we believe the modes of cleft-grafting as well as the whip-graft and Champin-graft, which we have described and illustrated by plain figures, are those which give the best results, generally. The extensive grafting operations of France are mostly confined to these methods, and practical experience is the best teacher in such matters.

We also deem it unnecessary to speak of the many machines and tools lately invented for grafting; as a good pruning knife, as described, is the tool most in use, and quite satisfactory in skilled hands.

We should here mention that, generally speaking, our American varieties do not take the graft as readily and surely as the European species. A graft of *V. Vinifera* on an American stock will rarely fail to grow if the operation has been properly performed; while success is not quite as certain when both, stock and scion, consist of American varieties, especially if of the hard-wooded kinds. Nevertheless, when well done, at the proper season and with well-conditioned wood, the operation will show a far greater percentage of success than of failure.

In our former edition we promised to experiment more largely with the grafting of European varieties on our native stocks here. We have made these experiments, and in September, 1880, we exhibited in St. Louis, at the meeting of the Mississippi Valley Horticultural Society, a number of fine foreign grapes, raised in open air, on grafted vines, in our own vineyards. But while success, in so far as protecting the European grape from the Phylloxera, has been highly satisfactory, we have found our climate, in this latitude, too unfavorable for the *V. Vinifera* to encourage us for more extensive operation. Not only are our winters too severe for the *V. Vinifera*, but the tendency of the latter to mildew makes their success too doubtful in all but the most favorable seasons. For our section of the United States, therefore, we would not recommend anything further than limited trials in this direction. But we think that there is a valuable field of operation for the enterprising grape-grower in some sections of the Southern States, where, under more favorable climatic conditions, the *V. Vinifera*, grafted upon Phylloxera-proof native stocks, would most likely give excellent results.

Just as we close this chapter on grafting, we receive the sad news of the death of Mr. Aimé Champin, who passed away on April 14, 1894. By his death, French viticulture, yes, we may say, grape culture throughout the world loses one of her brightest and most eminent devotees. A man of the highest intelligence, endowed with rare gifts of observation, he was an ardent student of nature, imbued with a deep spirit and a truly practical sense of her teachings, her wonders and her mysteries, which sense and spirit he had the happy faculty to impart to all his writings. He was one of the warmest champions for the resistant American grape root in its

mission of reconstituting the Phylloxera—destroyed French vineyards, and by his practical example as well as by his writings he has contributed a large share to the great success of that mission. His unsurpassed work on grafting, which we mentioned before, will stand as a lasting monument to his name.

PLANTING (Continued).

But now let us return to the *modus operandi* of planting. Take your vines, in a pail with water, or wrapped in a wet cloth, from the place where they were heled-in,* to the holes; when planting, let one person shorten the *roots*† with a sharp knife, then spread them out evenly to all sides, and let another fill in with well pulverized earth. The earth should be worked in among the roots with the fingers, and pressed to them with the foot. Lay the vine in slanting, and let its top come out at the stake previously set. Then, with your knife, cut back the top to a bud just above, or even with the surface of the ground. Do not leave more than two buds on any one of the young vines which you are planting, however strong the tops, or however stout and wiry the roots may be. *One* cane is sufficient to grow, and merely to be prepared for possible accident, both buds are allowed to start. The weaker of the two shoots may afterwards be removed or pinched back.

When planted in the fall, raise a small mound around your vine, so that the water will drain off, and in sections where the winters are very severe mounds should be made a little higher, even covering the upper buds, and a covering provided that will collect and hold the snow, which will be a warmer and better protection than manures; these should not be used on newly planted young vines. In spring the mounds should be carefully levelled down.

* On receiving your vines from the nursery, they should be taken out of the box, without delay, and *heled-in*, which is done as follows: In a dry and well protected situation, a trench is made in the soil 12 to 15 inches deep, wide enough to receive the roots of the plants, and of any required length, the soil being thrown out upon one side. The plants are then set thickly together in the trench, with the tops in a sloping direction and against the bank of soil thrown out of the trench; another trench is made parallel to the first, and the soil taken from it is thrown into the first, covering the roots carefully, filling in all of the interstices between them. Press down the soil, and smooth off the surface, so that water shall not lodge thereon. When one trench is finished, set the plants in the next, and proceed as before. When all this is completed, dig a shallow trench around the whole, so as to carry off the water and keep the situation dry.

† If the roots are not too long, say not over 15 to 18 inches, they do not need shortening, merely trimming off any ragged or broken ends. The holes should be dug large enough, however, to accommodate the roots without twisting or crowding.

It is a well-authenticated fact that, under the action of nitrogenous agents, the grape grows more luxuriantly, its leaves are larger, its product increases in quantity. But overfeeding produces a sappy growth of soft and spongy wood, with feeble buds or eyes, which are in far greater danger of being winter-killed. Moreover, nitrogenous substances exclusively used hasten the decay of vineyards and the exhaustion of the soil, and even those authorities who favor manures in *preparing* certain grounds, or long *after* planting, mean a compost made of *old* barnyard manure, leaf mould, broken bones, etc., laid up to rot and frequently turned; but do not allow any decomposing organic matter to come in contact with the newly planted vine. Yet, a favorable climate, a suitable soil and situation, sound, strong, well-rooted, No. 1 plants, properly planted, are not sufficient for success in grape-growing—the vine must have besides proper treatment and cultivation; and there is perhaps no fruiting plant that bears skillful training more kindly, or which responds more abundantly to the attention of the careful grower. And the fact that almost equally good results appear to be obtained, for particular purposes and varieties, under various different methods, caused a great diversity of opinion as to the proper system or greater advantages of any method of training and pruning the vine.

The value of removing a portion of the wood of a grape-vine was brought to notice by observing the effect produced by the browsing of a goat. American grape culture is yet in an experimental stage. Half a century ago, European methods were the only ones practiced; and though the fundamental principles are alike for both European and American grapes, our best viticulturists gradually recognized that widely differing varieties require different treatment, and that American species of grapes being widely different and distinct from the European, they demand also different methods of treatment in some important details. The evolution of American grape training—says Prof. L. H. Baily of Ithaca, N. Y., (in the preface to his excellent treatise on American Grape-Training, 1893) is one of the most unique and signal developments of our modern horticulture and its very recent departure from the early doubts and trials is a fresh illustration of the youth and virility of all horticultural pursuits in North America.

It would be impossible to describe all the variations in grape-training in the space of this brief manual: no hard and fast lines can be laid down, either for any system or any

variety, and the attempt to do so would only be confusing.

During the first summer little else can be done than to keep the ground mellow, loose about the plants and free from weeds; stirring the ground frequently, especially in dry weather, is the best stimulant, and a finely tilled surface, even when reduced to a mere layer or bed of dust, is the very best mulch in a dry season. It is not necessary to tie up the young vines during the first summer, nor to pinch back the laterals. A stouter, short-jointed cane will thus be produced. Some grape-growers prefer, however, to allow but one shoot, the strongest, to grow, and break the others off, then tie this one shoot to a stake, and pinch back the laterals to one or two leaves each. In the fall, after the foliage is all off, cut back to *two or three buds*. If any vacancies have occurred, fill out, as soon as possible, with extra strong vines of the same variety.

During the following winter, the TRELLIS should be built. The plan adopted by most of our experienced grape-growers, as possessing some advantages over other plans, especially if grapes are grown in large quantities, is as follows: Posts of some durable timber (red cedar is best) are split, 3 inches thick and about 7 feet long, so as to be 5 feet in height after being set; these posts are set in holes 2 feet deep, 16 to 18 feet apart in the rows (so that either two vines 8 feet apart, or three vines 6 feet apart, are between two stakes); *three* wires are then stretched horizontally along the posts, being fastened to each post with a staple ∩. The two end-posts should be larger than the others and *braced* (Fig. 64) so that the contraction of the wire (in cold weather) will not loosen them. Instead of the brace a short wire may be fastened to the top of the end-post and anchored to a rock sunk in the ground, or to a short stake about 3 or 4 feet beyond the end of the trellis, but in line with the same. The first wire is placed about 18 inches from the ground and the others 18 inches apart; this brings the upper wire about 4 feet 6

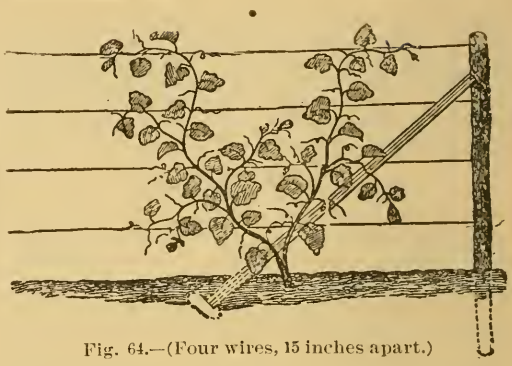

Fig. 64.—(Four wires, 15 inches apart.)

inches from the ground. No. 12 wire is strong enough. At the present prices of wire the cost per acre will be from $15 to $30, according to distance of rows and number of wires used. Many grape-growers now place the lower wire about 30 inches from the ground and use only two wires, or if they use three, they carry the trellis correspondingly higher. This affords a better circulation of air, besides greater convenience in hoeing and cultivating.

Galvanized wire is the best and cheapest in any case.

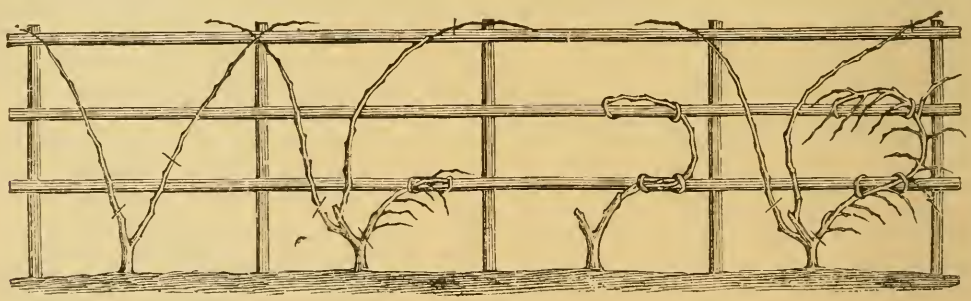

Fig. 65.

In place of the wire, slats or laths may serve the same purpose (as seen in Fig. 65), but they are not durable, and the posts must then be put in much closer. Another mode of making wire trellis (the Fuller plan) is with horizontal bars and perpendicular wires, as shown in Fig. 66. Posts of good, hard,

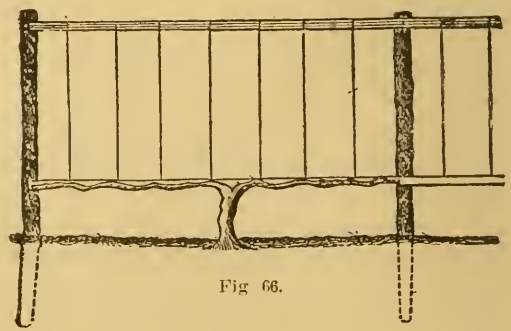

Fig. 66.

durable wood, 3 inches in diameter and 6½ to 7 feet long, are placed between the vines, at equal distance from each vine, and in a line with them, 2 feet deep in the ground. When the posts are set, nail on strips about 2½ inches wide and 1 inch thick, one strip or bar being placed 1 foot from the ground, and the other at the top of the posts. Then take No. 16 wire and put it on perpendicularly, twisting it around the lower and upper bar, at a distance of about 12 inches apart. As a pound of No. 16 wire gives 102 feet, the additional expense is but very small. This trellis will probably cost less than one with horizontal wires, and is preferred by some.

Fig. 67.

Practical experience, however, speaks in favor of horizontal wires. A good many grape-growers train their vines to *stakes*, believing it to be cheaper; and the decline in the price of grapes and wine induces many to adopt the least costly plan.

This method has also the great advantage of allowing us to cultivate, plow and cross-plow the ground in all directions, leaving but little to hoe around the vines. Some use *one stake* only, as shown in Fig. 67, but with our strong growers this mode is apt to crowd foliage and fruit too much; others therefore use *two*, and, where timber is plenty, even *three stakes*, placed around each vine, about 10 inches from it, and wind its canes around them spirally until they reach the top. The disadvantage of training on stakes is, that these soon rot in the ground, and must be almost annually taken out, repointed and driven into the soil, consequently require more labor, and are not as durable as trellis, unless cedar poles, or other very durable timber is used. A very simple combination of the trellis and stake system (as shown in Fig. 68) requires but *one* wire for the bearing canes and much lighter stakes; but this method does not afford the advantage of cross-plowing.

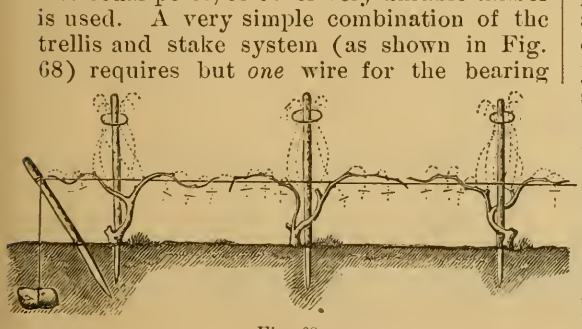

Fig. 68.

To secure this advantage and at the same time to give to our strong growers more space and the benefits of high training, we recommend an "*Arbor Trellis*," the construction of which is shown in Fig. 69. Though more

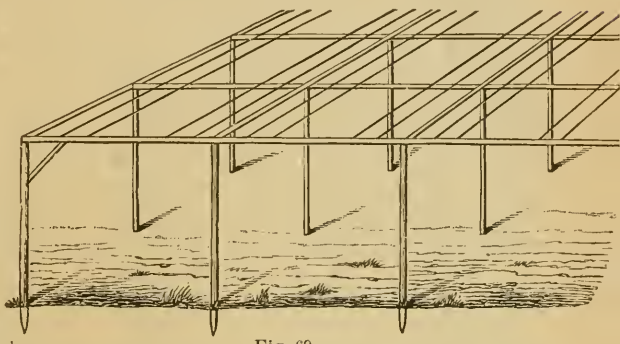

Fig. 69.

expensive in construction than the ordinary trellis, this overhead system affords many advantages, especially for our strong growing and hardy varieties. A comparatively greater freedom from fungoid diseases, increased productiveness, with the cost of cultivation and hand labor reduced to a minimum, are the principal advantages.

For this method of training the vines should be tied up the first summer already to a higher stake or pole, and if they make a sufficient growth, the permanent stakes, which form the support of the overhead trellis, may be set during the first winter. These stakes should be about 7½ feet long, of some durable wood. They need not be very heavy as they are tied or braced together at the top in each direction by the slats running lengthwise and crosswise, which gives this trellis an unusual strength of construction. The height of the trellis should be six feet above the ground, enabling an ordinary horse or mule to pass underneath in cultivating. The young vine at the end of the first season should be pruned long enough to reach up to the trellis, and allowed there to branch out and spread over the horizontal wires. In subsequent years a modified form of renewal pruning, or simply spur pruning, or a combination of both may be adopted. In tieing up the cane of the first season's growth, it is well to wind it in a long spiral around the stake or post. This gives it a better hold, and as the vines grow heavier will hold the stakes in place even if it should rot off at the bottom. Summer-pruning and tying is almost entirely dispensed with. The fruit-gathering is, however, less convenient, and none but quite

hardy, vigorous varieties should be thus trained.

Some people believe that we could even dispense with both trellis and stakes entirely, and urge the adoption of the "Souche" or "Buck Pruning" plan, used in parts of France and Switzerland, but quite impracticable for our strong growing species in this climate.

If you have covered your young vines last fall, remove the earth from over them at the approach of spring, as soon as danger from frost is past; *then cultivate the whole ground*, plowing *between the rows* from four to six inches deep, and carefully hoeing around the vines with the two-pronged German hoe or *Karst*, or *Hexamer's pronged hoe*. The ground should thus be broken up, inverted, and kept in a mellow condition *continually; but do not work the ground when wet.*

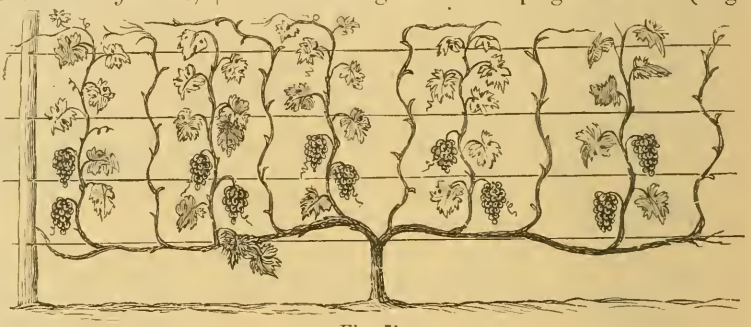

Fig. 71.

During the *second summer* a cane or shoot is produced from each of the two or three buds which were left on the young vine last fall. Of these young shoots, if there are three, leave only the two strongest, tying them neatly to the trellis, and let them grow unchecked to the uppermost wire.

With the strong-growing varieties, especially where we intend to grow the fruit on laterals or spurs, the two main canes are pinched off when they reach the second horizontal wire, whereby the laterals are forced into stronger growth, each forming a medium-sized cane, which is shortened in the fall from four to six buds. One of the two main canes may be layered in June, covering it with mellow soil, about an inch deep, leaving the ends of the laterals out of the ground. These will generally make good plants in the fall for further plantations; with varieties which do not grow easily from cuttings, this method is particularly desirable. Fig. 70 shows the vines tied and pruned, accordingly, at the end of the second season, (the cross lines through the canes showing where they are cut off or pruned).

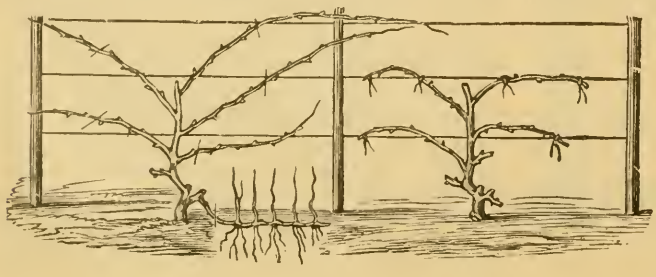

Fig. 70.

Another good mode of training, recommended by Fuller, is to bend down in fall, at the end of second season, the two main canes of the vines (the laterals of which have been pinched back to concentrate the growth into these main canes) in opposite directions, laying and tying them against the lower wire or bar of the trellis, as shown in Fig. 66, and shortening them to four feet each. Then let five or six of the buds on the upper side of the arms be grown into upright canes. (Fig. 71.) All buds and shoots not wanted for upright canes should be rubbed or broken off. This latter method is not well adapted for varieties which require covering in winter. Where the canes are started lower, near the ground, and cut loose from the wire, they can be easily covered with earth.

At the *commencement of the third season* (uncover and) tie the canes to the trellis. For tying, any soft string or stout yarn may be used; some obtain their tying material from basswood-bark, soaked for two weeks or longer in running water, others plant the Golden Willow, and use its small twigs for tying purposes. Tie closely, and as young canes grow keep them tied, but, in all cases, take care against tying too tightly, as the free flow of sap may be obstructed.

The ground is now plowed and hoed again, as before. One plowing in spring, taking care, however, not to cut or tear the roots of the vines, and two or more shallow cultivations in summer. From each of the buds left at the last pruning (as shown in the preceding figures), canes can be grown during the third year, and each of these canes will probably bear two or three bunches of fruit. There is danger of their being injured by over-bearing, on which account the bunches should be thinned out by taking away all imperfect bunches and feeble shoots.

No grape-vine, however trained and apparently strong, should ever be allowed to carry more fruit than it can bring to perfect maturity and at the same time produce healthy and well-ripened canes for the next season's bearing. Over-bearing is always attended with unfortunate results, says Geo. W. Campbell—and there is no better teacher of grape culture living:—from this cause the healthiest vine may be so enfeebled as to be destroyed by any unusual severity the following winter; or, when the injury is not so serious, the vine may bear a light inferior crop the following year, but remain weak forever.

In order to secure future fruitfulness of the vine, and at the same time to keep it in our convenient control, we should allow no more wood to grow than we need for next season's bearing, and for this purpose we resort to *spring pruning*, generally, though improperly, called

SUMMER PRUNING.

The time to perform the first summer pruning is when the young shoots are about six inches long, and when you can plainly see all the small bunches—the embryo fruit. We commence at the two lower spurs, having two buds each, and both started. One of them we intend for a bearing cane next summer, therefore allow it for the present to grow *unchecked*, tying it, if long enough, to the lowest wire. The other, which we intend for a spur again next fall, we pinch with the thumb and finger to just beyond the last bunch or button, taking out the leader between the last bunch and the next leaf, as shown in Fig. 72, the cross line indicating

Fig. 72.

Fig. 73.

where the leader is to be pinched off. We now come to the next spur, on the opposite side, where we also leave one cane to grow unchecked, and pinch off the other.

We now go over all the shoots coming from the arms or laterals tied to the trellis, and also pinch them beyond the last bunch. Should any of the buds have pushed out two shoots, we rub off the weakest; we also take off all the barren or weak shoots which may have started from the foot of the vine.

The bearing branches having all been pinched back, we can leave our vines alone until after the bloom, only tying up the young canes from the spurs, should it become necessary. Do not, however, tie them over the bearing canes, but lead them to the empty space on both sides of the vine, as our object must be to give the fruit all the air and light we can without depriving it of the necessary foliage, which is of greatest importance for the formation of sugar in the berries. To do so the leaves must be well developed and healthy. Diseased, mildewed foliage, however, will not promote the sugar formation, but rather impede the same.

By the time the grapes have bloomed, the laterals will have pushed from the axils of the leaves on the bearing shoots. Now go over these again, and pinch each lateral back to one leaf, as shown in Fig. 73. In a short time the laterals on the fruit-bearing branches which have been pinched, will throw out suckers again. These are again stopped, leaving one leaf of the young growth. Leave the laterals on the canes intended for next year's fruiting to grow unchecked, tying them neatly to the wires with bass or pawpaw bark, or with rye straw.

If you prefer training your vines on the horizontal arm system (Fig. 71) the mode of summer pruning will in the main be the same. Pinch off the end of each upright shoot *as soon* as it has made two leaves beyond the last bunch of fruit; the shoots after being stopped will soon start, and after growing a few inches should be stopped again, as we wish to *keep* them within the limits of the trellis, and the laterals should be stopped beyond its first leaf. Thus we try to keep the vine equally balanced in fruit, foliage and wood. It will be perceived that fall pruning, or shortening-in the ripened wood of the vine, and summer pruning, shortening-in and thinning out of the young growth, have one and the same object in view, namely, to keep the vine in proper bounds, and concentrate all its energies for a two fold object, namely, the production and ripening of the most perfect fruit, and the production of strong, healthy wood for the coming season's crop. Both operations, in fact, are only different parts of one and the same system, of which summer pruning is the preparatory, and fall pruning the finishing part; but while the vine will bear, without apparent injury, any reasonable amount of pruning during its dormant state, in the fall or winter, any severe cutting

during the summer is an unmitigated evil. Campbell says: "All the summer pruning I would recommend, would be the early rubbing out of superfluous shoots, upon their first appearance; leaving only what is required for next year's bearing wood. This, with the pinching or stopping the ends of such shoots or canes as were disposed to be too rampant in growth, would be all I would ever consider necessary. Some of the most successful grape-growers within my knowledge carefully prune their vines in fall or early spring, and then leave them entirely without summer pruning."

We are glad to see that the old practice of cutting and slashing the young growth in July and August is generally discountenanced. It has murdered more promising vineyards than any other practice. But people are apt to run to extremes, and many are now advocating the "let alone" doctrine. We think both are wrong, and that the true course to steer is in the middle.

1. Perform the operation EARLY. Do it as soon as the shoots are six inches long. At this time you can oversee your vine much easier. Every young shoot is soft and pliable. Remember that the *knife* should have nothing to do with summer pruning. Your thumb and finger should perform all the work, and they can do it easily if it is done early.

2. Perform it *thoroughly and systematically.* Select the shoots you intend for bearing wood for next year. These are left unchecked; but do not leave more than you really need. Having selected these, go over each arm or part of the vine, pinching every fruit-bearing branch above the last bunch of grapes, or, if this should look weak or imperfect, remove it and pinch back to the first perfectly developed bunch. Should the bud have pushed out two or three shoots, it will generally be advisable to leave only the strongest, and remove the balance. Do not think that you can do part of it a little later, but be unsparing in taking away *all* you intend to take this time. Destroy all the caterpillars and all the insects you find feeding on the vines, and the steel-blue beetle, as it will eat into the buds. But protect the lady-bug, mantis, and all the friends of the vine.

After the first pinching, the dormant buds in the axils of the leaves, on fruit-bearing shoots, will each push out a lateral shoot opposite the young bunches. These serve as elevators of the sap, and also as an excellent protection and shade to the fruit. Remember, our aim is not to rob the plant of its foliage, but to make *two* leaves grow where there was but *one* before, and at a place where they are of more benefit to the fruit. By our method, our rows of vines have the appearance of leafy walls, each bunch of the fruit properly shaded, and yet each part of the vine is properly ventilated.

As we have said before (page 44), that it would be impossible and confusing only to describe the many various systems of grape training; so it would be useless to construct rules for their pruning. If we understand the philosophy and objects of both thoroughly, their methods will be easily learned and understood on the vine by a little practice. *Pruning* refers to the removal of such branches as shall insure upon the remaining portion of the vine better and larger fruit. *Training* refers to the form, the disposition of the different parts of the vine. There is, in essence, but *one* method of *pruning*, while there are as many methods of *training* as there are fancies among grape-growers, which necessarily modify the *style* of pruning, so as to adapt it to the shape desired, but does not affect the principles upon which pruning rests; being based upon the fact that the fruit of the grape-vine is borne (in a few clusters near the base of the shoots of the season) on *wood of last year's growth.*

And the objects we must ever keep in view are:

1. To keep the vine within proper manageable bounds, so that it is at all times under the control of the vintner, *without weakening its constitution by robbing it of a great amount of foliage.*

2. To facilitate cultivation and spraying.

3. *Judicious thinning of the fruit* and *developing strong, healthy foliage*, forcing the growth of the laterals, and having *two* young, healthy leaves opposite each remaining bunch, which will shade the fruit and serve as conductors of the sap to the fruit.

4. *Growing vigorous canes for next year's fruiting and no more*, thereby making them stronger.

5. To produce larger and better fruit, now and in the future.

An old French method: GIRDLING THE GRAPE-VINE, to obtain the last named object, that of producing some extra fine, large clusters, often successfully practiced by gardeners, should here be mentioned.

Girdling consists in removing a ring of bark, about half an inch in width, below the lowest fruit bud, using as a tool the small blade of a jack-knife. By this removal of the bark the downward flow of the sap is checked at the point of bark-denuded wood. Instead of removing the bark two copper wires may be fastened on the cane with the same effect, which is: to increase the size and earliness of the fruit so treated. This

operation, if performed at all, should be made as the clusters, intended for experiment or exhibition, have formed and the berries got to be the size of buckshot.

There is no doubt that it causes the fruit of the varieties of grape to mature earlier and to magnify its clusters and berries; but the question is whether or not girdling is detrimental to the health of the vine.

It is said that in the island of Xante (Greece) the growers of the grape-currant made a regular practice of girdling the canes of their vines, and we cannot see that it will seriously affect the vigor of the entire plant if used moderately, on but few of its arms, which are anyhow to be removed in pruning, while the advantages of it doubtless makes it profitable in some cases.

FALL OR WINTER PRUNING

May be performed at any time, during mild days, while the vine is in a dormant state, generally from November to March, but should be done at least a week before vegetation is likely to commence. Tender varieties should not be allowed to pass through our sometimes severe winters without the protection afforded by a mulch of litter, leaves, earth, or other covering, to prevent injury from alternate freezing and thawing; the vines which are not hardy must therefore be pruned in November, when they are simply laid down on the ground and mulched lightly, to be uncovered again in spring, just *before* they are ready to put forth new growth from their swelling buds. Farther north, the practice of covering up the vines, both top and roots, is recommendable also with the hardy varieties.

Different varieties will require somewhat different treatment; some varieties (strong growers) will fruit better if pruned to spurs on old wood than on young canes, retaining the old canes and pruning the *healthy*, strong shoots or laterals they have to two buds, whereas others (only moderate growers) will flourish and bear best when pruned short and to a cane of last year's growth.

The observing vintner will find some hints in our descriptive catalogue, but only by practice and experience can he learn the best method for each variety.

Some varieties will bear more readily and larger bunches upon the laterals of the *young* canes, some upon the spurs of a few eyes on *old* bearing branches, and some will fruit readily upon the principal canes. This should govern you in pruning.

Most of the *strong growers* of the Labrusca species (Concord, Hartford, Ives, Martha, Perkins, etc.), as well as some of its more vigorous hybrids (Goethe, Wilder, etc.), and especially some Southern Æstivalis (Herbemont, Cunningham, Louisiana, Rulander), *will fruit best on the laterals of the young canes of last summer's growth*, provided they are strong enough, which they will be if they have been pinched according to our directions; the fruit-buds at base of the principal canes are seldom well developed and will not bring much fruit. We therefore grow the fruit on the laterals, which can be shortened in to from two to six eyes each, according to their strength. All these rank growers should have plenty to do—that is, they should be pruned long, much longer than is generally done. Should too many bunches appear, you can easily reduce the number at the first pinching. All the Riparia and some of the Æstivalis class (Cynthiana and Norton's Virginia), *produce best on spurs on two- or three-year-old canes;* they will also bear better on spurs on laterals than on main canes, but may not produce their best fruit until they can be "spurred in" on old arms. For this purpose, select for your spurs strong, well-ripened shoots; cut them back two to three eyes each, and cut out all the small and imperfect ones. You may leave from thirty to fifty buds, according to the strength of your vine, and always bear in mind that you can reduce the number of bunches when summer-pruning.

A third class produces readily and abundantly from the main canes. This comprises the varieties which do not grow very strong, the more *tender Labrusca*, and all of more or less *Vinifera* characteristics, viz.: the Alvey, Catawba, Delaware, Iona, Rebecca. These will produce best on short canes of say six eyes; short pruning and the old renewal plan may be as good as any for them. There is also much more danger of overtasking *this class* than both of the others.

Different methods apply to different varieties, and we may add that they ought also to be modified according to other circumstances. Those, therefore, who have recommended various and contradictory systems of training and pruning may each have been right; but were wrong in believing their preferred method the only correct method *in all cases*, or equally well adapted for all species and varieties of grapes. Bearing this in mind, the intelligent vintner will soon learn how far one or the other system is best applicable in his case.

To bring this new edition of our Grape-Manual up to date, in this respect, we should mention, however, the unique system of training lately devised by our friend T. V. Munson of Texas: Two posts are set in the same

hole, their tops diverging. A wire is stretched along the tops of these posts and a third wire is hung lower, *between* them. The trunk of the vine, or its head, is secured to this middle lower wire and the shoots top over the side wires. The growth therefore makes a V-shaped or trough-like mass of herbage, as shown in Fig. 74.

The bearing canes, two or four in number, which are left after the annual pruning, are tied along the middle wire. The trellis stands six feet high; the shoots stand upright at first, but soon hang down supported by the side wires. Mr. Munson gives the following account of the system: After the vines have flowered, the bearing laterals have their tips pinched off; and that is all the summer pruning the vine gets, except to rub off all eyes that start on the body below the crotch or fork. Two or four shoots, according to strengsh of vine, are started from the fork or crotch and are trained along over the lower central wire for renewal canes. When pruning time arrives, the entire bearing cane of the present year, with all its laterals, is cut away at a point near where the young renewal shoots have started, and these shoots are shortened back, according to strength of vine. The different varieties are set at various distances apart, according as they are strong or weak growers.

"Thus the trellis and system of pruning are reduced to the simplest form. A few cuts to each vine cover all the pruning and a few ties complete the task. A novice can soon learn to do the work well. The trunk or main stem is secured to the middle lower wire, along which all bearing canes are tied after pruning, and from which the young laterals which produce the crop are to spring. These laterals strike the two outer wires, soon clinging to them with their tendrils, and are safe from destruction, while the fruit is in best possible position for spraying and gathering, and is still shaded with the canopy of leaves.

Among the advantages secured by this system are: Simplicity and convenience of trellis, allowing free passage in any direction through the vineyard; circulation of air without danger of breaking the tender shoots; ease of pruning, spraying, cultivation, harvesting. Maintenance of the vine's natural habit. Ease of laying down in winter; the vine being pruned and not tied, and can, at the proper season, be again quickly raised and tied in position; and its construction is cheap and durable.

A similar method of training, but more suitable to the wind-beaten shores of Long Island has been introduced and successfully tried for several years by Mr. Elbert Wakeman, a distinguished amateur grape-grower of Oyster Bay, L. I. Fig. 75 illustrates this method. The trellis is 3½ to 4 feet high only; the bearing canes are fastened to the two side wires when long enough, making a V-shaped trough of branches and foliage, like the former; there is space enough between the wires for the bunches to hang down, free from any interference and just the proper height to be easily bagged and sprayed. It is strong, not very expensive and will pay for the little extra care.

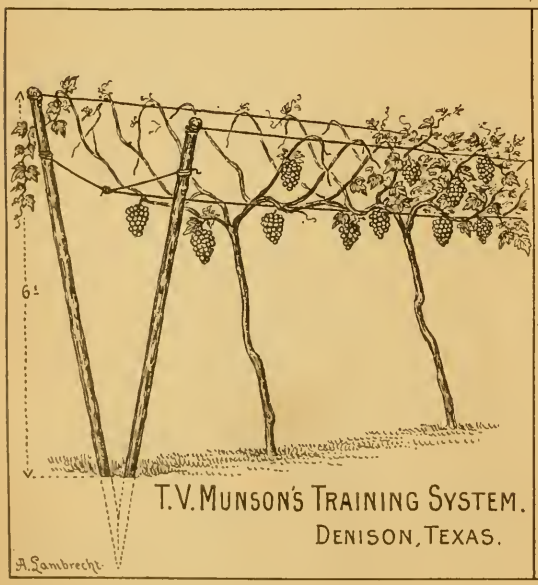

Fig. 74.

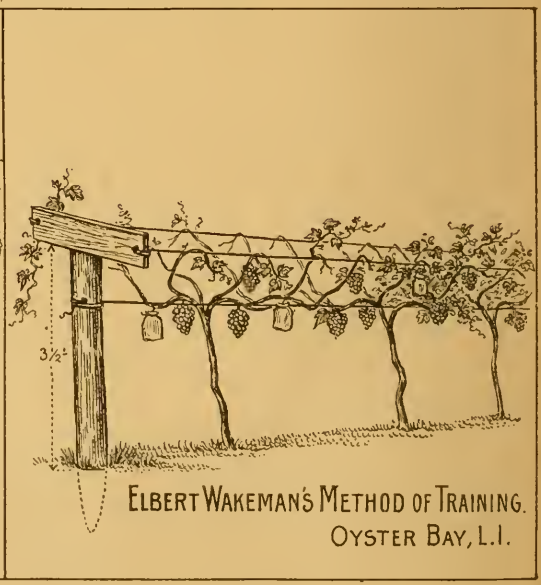

Fig. 75.

SUBSEQUENT MANAGEMENT.

We may now consider the vines as fully established, able to bear a full crop, and, when tied to the trellis in spring, to present the appearance as shown in Fig. 76.

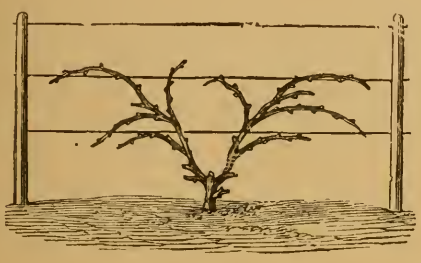

Fig. 76.

The operations are precisely the same as in the third year, with this important difference, however, that the plowing should be shallow; as soon as vines have become established, the cultivator should be used for the destruction of weeds and keeping the surface-soil mellow. The hoe will be needed to kill the weeds immediately around the plants, as before. At the last plowing in the preceding fall the furrow-slice should have been thrown TOWARDS the vines, thus affording additional protection to the roots—also facilitating the laying down and covering of the canes, if necessary. Top dressing of lime, ashes, bonedust, &c., may, if needed, be best applied at the same time. In the following spring, therefore, the first plowing should be reversed, and the ground will be level.

Plowing in the vineyard should never be so deep as to injure the roots of the vines.

If you train your vines on the horizontal system, the upright canes, which were pruned back to two buds each, will now produce two shoots each. If more than one shoot should proceed from *each* of these *two* buds, or if other shoots should start from small buds near the arms, only the strongest one should be allowed to grow, and all others rubbed off. Instead of ten to twelve upright canes, you will have twenty to twenty-four, and, allowing three bunches to each, you may get seventy bunches to every vine the fourth year after planting. These canes are now to be treated the same, as regards stopping, pinching laterals, etc., during each subsequent year of their growth,

There are many other modes and systems of training, but the same general rules and principles prevail in nearly all.

There is one well-authenticated fact in the fruiting of the grape, viz.: that the finest fruit, the best, earliest and largest crops are produced upon the strongest shoots of the previous years' growth. The only proper system of pruning will therefore be that which encourages and secures an abundance of such shoots. By this general principle all new systems, so called, should be proved, and beginners in grape culture may be able to guard against receiving false impressions with reference to any mode which may fall under their observation; and this caution is the more necessary as young vines will bear good crops for a *few* years, even under very indifferent treatment. In all systems of training which involve the retention of wood beyond five or six years, as in the case of spur pruning, and the methods with permanent horizontal branches, it is absolutely essential to remove the older wood at certain periods, and replace it with younger wood from near the base of the plant. Fixed rules can hardly be given for an operation which requires so much thought and such close acquaintauce with the growth and bearing habits of the different varieties.

If you desire to train your vines *for arbors* or on walls, set an extra strong young plant, in rich, well-prepared soil; leave but one shoot to grow during the first summer, and if necessary, even during the second, so that it may get very strong. Cut back to three eyes in fall, these will each throw out a strong shoot, which should be tied to the arbor they are designed to cover, and allowed to grow unchecked. These three canes will be cut back in the fall following, to three buds each, which will give us three principal branches, each producing canes the third or fourth season; of each of these branches, cut next fall one cane to two eyes, and the others to six or more buds, according to the strength of the vine, then gradually increase the number of branches and cut back more severely those which fruited. In this manner a vine can be made in the course of time to cover a large space, produce a large quantity of fruit, and get very old.

Those who desire further information and directions on various modes of pruning and training, or on the culture of grape vines in glass houses, we refer to Chorlton's Grape-Growers' Guide; Fuller's Grape Culturist; Hoare's Cultivation of the Grape-Vine on Open Walls, and other books on grape culture, especially to an article on Pruning and Training the Grape-vine, by WILLIAM SAUNDERS, U. S. Department of Agriculture. Report, 1866; and to the latest "Account of the leading forms now in use of *Training* the American Grapes," by Prof. L. H. BAILEY, (New York, 1893), a most valuable book.

DISEASES OF THE GRAPE-VINE.

INTRODUCTORY REMARKS.

The vine, despite its vigor and longevity, is subject to diseases the same as other organisms. As the causes of these diseases can not be wholly eliminated, and as comparatively few of the maladies can be prevented or cured, our first aim should be toward selecting healthy plants and hardy varieties.

You have already been warned against planting grape-vines in heavy, wet soil, where water stagnates, or in places exposed to early and late frosts. You have been impressed with the necessity of clean cultivation, stirring the soil,* proper training, and thinning the fruit. If these points be disregarded even the healthiest and most vigorous varieties of vines will become diseased.

Thanks to the efforts of scientists in both this country and Europe, our knowledge of grape diseases, especially those caused by parasitic fungi, has been materially increased during the past few years. Our National Government has taken an important part in this work, and hand in hand with our sister Republic France, has done a great deal towards clearing up the mystery surrounding the subject. To the French we owe the discovery of the Bordeaux mixture, the remarkable effects of which, as a fungicide and as an agent capable of producing physiological effects on the higher plants, are as yet only partially understood.

At the time the last edition of this catalogue was issued our knowledge on the subject of grape diseases was very meager. However, through the kindness of our lamented friend, Dr. Geo. Engelmann, we were able to present to our readers, the latest known facts on the subject. As a tribute to the memory of Dr. Engelmann we have decided to publish again the article penned by him, and first in the Transactions of the Academy of Science, St. Louis, 1861, Vol. II, p. 165, and revised by him for this catalogue in 1883. Many of the points mentioned in the paper have long been settled, still there is no gainsaying the fact that the majority of the statements are as valuable today as they were when written.

We give below Dr. Engelmann's article, followed by another prepared at our request by Mr. B. T. Galloway, of the United States Department of Agriculture, who is acknowledged authority on this subject. Mr. Galloway's article, briefly and in a practical manner, brings together the latest facts on grape diseases and their treatment.

The Diseases of Grape-Vines.

BY DR. GEORGE ENGELMANN.

"The diseases of the grape are caused principally by animal and vegetable parasites. I leave others, who are more conversant with the subject, to treat of the former, and will merely state here that our species have all grown up with the Phylloxera, and would long ago have been extinguished or rather never could have lived, if that insect had such power over them; but they as well as the insect live on, the latter having no other nourishment than the grape-vines and their roots—you may call it an accommodation between them.

"More important for us in America are the fungous diseases, which do our grape crops more harm than the Phylloxera. It is said that in Europe they have discovered over two hundred kinds of fungi which live on the different parts of vines, but fortunately only a few of them are really injurious. These are, above all, the mildew of the leaves and the black rot of the berries. In Europe, besides our mildew, which has lately been introduced, they have the Oïdium and the Anthracnose.

"The Mildew (*Peronspora viticola*) appears in frostlike, white spots on the under side of leaves (hairy as well as glabrous ones), and may generally be observed here in Missouri from the beginning of June, fostered by the sultry and damp or wet weather usual at that season; in the Eastern States it seems to come on later in summer and in the fall. Though most common on the leaves, it sometimes also infests the petioles of the leaves, the stems of the bunches, and the very young berries. But even if it does not attack the latter, the effect on the leaves alone, which turn brown in spots and are eventually partially or completely killed, destroys the fruit, the berries shriveling from the base, turning light brown without falling off. This is here sometimes termed "brown rot."

"The fungus at first pervades the cellular tissue of the leaf; then, a few days later, the minute fungous stems protrude through the stomats (breathing pores) of the lower surface, forming little upright branching plantlets, which might be compared to a miniature spruce tree, singly, not visible to the naked eye; at the end of the branchlets they bear the summer spores (conidia), which mature, are discharged, spread by wind or otherwise, and when moistened germinate with astonishing rapidity. Late in the season the fungus produces what are called the resting spores (oöspores) in the interior of the leaf tissues, and while the others propagate the parasite in summer, these larger and more enduring ones keep alive through winter and insure its growth in the following summer. Thus it is seen that the dead, mildewed leaves, containing the resting spores, really do preserve the germs for the next season's mildew. These leaves ought to be destroyed by carefully gathering and burning them, or by burying them *deep* in the ground. The direct destruction of the fungus has often

* We are aware of the fact that in certain seasons and peculiar soils, neglected vineyards, filled with grass and weeds, have escaped diseases and borne full crops, while well-hoed and cultivated vineyards suffered severely, especially from rot. Such cases, however, are exceptions, not the rule; notwithstanding, they have led some grape-growers to advocate non-cultivation and even grass-sowing in their vineyards. As a result of this in a few years the vines became stunted and unproductive.

been attempted, and by different means, especially by sulphur-sprinkling, but without any marked effect. A dry spell of weather, however, arrests it most effectually for the time being.

"The Peronospora has since 1878 made its appearance in Europe—like the Phylloxera, accidentally introduced from this country—and has added another terrible infliction on the wine-growers there, threatening to be worse than the Oïdium, which years ago used to decimate the grape crops of Europe

"A few words about this Oïdium may be in place here. This is a mildew-like fungus which appears on the outside of the upper surface of the vine leaves, and bears its fewer spores on smaller, not much branched stemlets. It destroys the vitality of the leaves, and with it the crop, just as our mildew does. Its resting spores are unknown and with its life history we are not so well acquainted, but we know that sulphur sprinkled over the leaves will destroy it. It made its first appearance, as far as it is known, about 1845, in graperies at Margate, near London, and spread rapidly and destructively over a great part of Europe and the islands, especially Madeira, where grape culture was almost annihilated by it; but it seems now to be less common or less injurious than it was years ago, and may possibly have run its course, just as other epidemics are apt to do. It is unknown where it originally came from; some suppose that it originated in America, but it has never appeared here in the form under which it is known in Europe; whether in another form, is still questionable among our best mycologists. At all events we have thus far only one destructive form of mildew here, the Peronospora.

"The second great fungus pest of our vineyards is the black rot (*Phoma uvicola*). On the berries, but never on the leaves or stems, generally about the time that they are full grown, in July or August, very rarely on half-grown berries in June, a light brown spot with a darker central point is observed on the side and not near the stem. This spot spreads, and darker, shining nodules or pustules, plainly visible with the naked eye, begin to protrude above the epidermis; at last the whole berry shrivels up, turns bluish-black, the pustules roughen the surface, and each one opening at its top emits a whitish, worm-like thread, which consists of innumerable spores glued together with a mucilaginous coating. In this condition the spores are inert, but rain will dissolve the mucilage and liberate and wash down the spores, or they will fall to the ground with the dead berries. What then becomes of them, whether they enter the soil, or how they propagate the fungus, is as yet unknown. At all events it seems advisable to gather all the affected berries, if such a thing can be done, and destroy them.

"In Europe they have another fungous disease of the grape, called in Germany *Brenner*, in France anthracnose, and described under the name of *Sphaceloma ampelinum*, which by some authorities has been supposed to be another form of development of our black rot, above described. The former attacks all the green parts, leaves, young stems, and green berries, and forms open wounds, which might be compared to ulcers; while our Phoma is restricted, as far as known, only to green berries, without breaking up the tissues or forming ulcers. The *Sphaceloma* seems to be an old disease in Europe, already known in the last century. Mycologists are now carefully studying these questions."

Fungous Diseases of the Grape and their Treatment.

BY B. T. GALLOWAY.

Since the last edition of this catalogue wonderful progress has been made in the study of the fungous diseases of plants, especially those affecting the grape. Black rot, the scourge which at one time threatened the vine industry of this country, need no longer be feared, nor is there any cause for apprehension on account of the Peronospora, or downy mildew, as it is now one of the easiest diseases to control.

The object of this paper is to bring together briefly, plainly, and practically the latest information in regard to the more destructive diseases affecting the vine in this country, especially such facts on treatment as have been brought out by the recent investigations and experiments.

The destructive fungous diseases affecting the vine.

Several hundred species of fungi, or microscopic plants, are known to attack the grape, but fortunately only four of these cause serious diseases in the United States. The diseases in question are black rot, downy mildew or brown rot, powdery mildew, and anthracnose. The foregoing will be briefly described in such a way that it is hoped grape growers may be able to distinguish them, and thereby be better qualified to adopt the preventive measures suggested.

*Black rot.**—The disease which for forty years or more has been known by the foregoing name, occurs in nearly all parts of the

* Guignardia bidwellii (Ell.) V. & R.

country east of the Rocky Mountains. So far as we are aware it has not reached California, but it is probably only a question of time when it will appear there. While black rot is present everywhere east of the Mississippi River, it is in and south of the States of New Jersey, Virginia, Ohio, Indiana, Illinois, and Missouri that it has proved most virulent, frequently destroying from 50 to 100 per cent of the crop. In 1885 the disease appeared in France, and for a time caused much alarm in all the grape-growing regions of Europe.

Black rot may be distinguished from the other diseases under consideration in several ways. In the first place it must be borne in mind that it is not confined to the fruit, but occurs on the leaves and young branches as well. The berries when first attacked show at one or more points upon their surface small, brownish, more or less circular discolorations. These rapidly enlarge and soon the rest of the berry turns brown, while the part first attacked assumes a blackish hue. Minute pimples now appear scattered irregularly over

Fig. 77.—Black rot.

the surface, and finally the berry withers, turns black, and ultimately dries up, but as a rule remains firmly attached to the stalk, as shown in Fig. 77.

As a rule the leaves show the disease about two days before the berries are attacked. Reddish-brown, more or less circular spots appear, and these soon run together, forming irregular-shaped blotches. What distinguishes the spots or blotches on the leaves from similar discolorations produced by certain atmospheric conditions is the presence of black specks, no larger than a pin point, scattered over the surface or grouped in a narrow band near the edge of the affected parts. The specks may be seen with the naked eye, but with a low-power magnifying glass they are brought out more prominently.

*Downy mildew.**—The diseases known in various sections as American mildew, brown rot, gray rot, grape Peronospora, etc , are all due to one and the same fungus, viz, *Peronospora viticola.* The downy mildew fungus has a wider distribution than black rot, and probably in the aggregate causes more damage. It occurs in nearly all the grape-growing regions of this country, and is also common in Europe and other parts of the Eastern Hemisphere.

Leaves affected with downy mildew show upon the upper surface greenish-yellow or brownish spots, of irregular size and shape. while opposite these discolorations, on the lower side, a downy, whitish, frost-like growth may be seen. In advanced stages of

Fig. 78.—Brown rot.

the disease or after a heavy rain the frost-like patches often disappear, leaving in their places light brown discolorations corresponding in size and shape with those on the upper side.

The fruit is frequently attacked, especially when young, the berries being covered with the downy, whitish growth of the fungus, similar to that occurring on the leaves. It is very common also in many sections to find

* Peronospora viticola B. & C

berries rotting from the attacks of this fungus and yet showing no external evidence of the parasite. Brown rot is the name usually given to this form of the disease. Berries affected with brown rot show at first small, purplish brown spots. Soon the entire berry turns brown, and the pulp becomes soft and often shrinks, forming depressions, over which the wrinkled but otherwise smooth and unbroken skin is stretched (Fig. 78).

*Powdery Mildew.**—Powdery mildew attacks the leaves, young shoots, and berries, covering the same with a whitish, cobweb-like growth. This disease is also widely distributed, being especially troublesome on the Vinifera grapes of the Pacific coast and Europe, and causing what is generally known as the Grape-vine Oidium. Leaves affected with the fungus show usually upon the upper surface a whitish, web-like, powdery growth, which is not restricted by anything like a definite border. The fruit shows a similar growth on the surface, but eventually, as a result of the attack of the parasite, the skin of the berries cracks, admitting other agents of decay, which soon finish the work of destruction.

Anthracnose.†—This disease has of late years attracted considerable attention in this country, where it occurs on the leaves, young shoots, and fruit. It prevails also in Europe, but has never proved as serious there as the downy and powdery mildews.

Leaves when first affected with this disease show minute blackish-brown spots, which are surrounded with a slightly raised darker-colored margin. Ultimately the center of the spots turns gray, and not infrequently the diseased parts separate from the surrounding healthy portions, leaving the leaf full of small, ragged-edged holes. On the shoots the disease manifests itself in much the same way as it does on the leaves. As it progresses, however, the spots usually retain their dark color and often run together, forming more or less elongated diseased areas, which gradually eat their way into the wood, and it is now known that the mycelium, or body of the fungus, passes the winter in the tissues surrounding these places.

Anthracnose on the fruit, or bird's-eye rot, as it is sometimes called, first appears as a black or brownish circular spot, surrounded by a narrow, somewhat darker rim. As the spots increase in size the color undergoes various changes. In some cases the outside rim remains dark brown, while inside of this is a wider zone of a beautiful vermilion color,

* Uncinula spiralis Berk.

† Spaceloma amplinum De Bary.

Fig. 79.—Anthracnose.

surrounding a grayish-white center (Fig. 79). Frequently the spots, when less than one-eighth of an inch in diameter, assume a grayish-white color, which they retain throughout the rest of their growth. When the berries are small the disease often manifests itself in another way. The fruit turns brown and shrivels up, and at the same time little pinkish pustules appear on the surface.

This form of rot is not characterized by a softening of the tissues, as is the case with others we have mentioned. The tissues slowly collapse, at the same time becoming hard and leathery.

Methods of combating the diseases.

With the exception of Anthracnose, all the diseases described in the foregoing pages may in large part be successfully combated by applying, at the proper time, either in the form of a liquid or powder, certain substances known as fungicides. The fungicides do not injure the young and tender parts of the vine, but they do destroy or prevent the development of the parasitic organisms which bring about the diseases described. The application of a fungicide, therefore, acts, to a certain extent, as a shield to the various parts of the grape, protecting them from infection in much the same way that a glass jar or paper bag would protect. It will be seen from what has been said that the treatments are largely preventive, not curative, hence the importance of doing everything at the proper time,

the object being to keep ahead, so far as possible, of the fungous parasites, which are ready to infect the host whenever the proper conditions are present. The directions for treatment given in the accompanying pages are based on many experiments, and if followed closely there is no reason why the work should not be successful. Of course it is manifestly impossible to lay down rigid rules in a case of this kind. Judgment must be exercised in all phases of the work.

WHAT FUNGICIDES TO USE.

For the diseases under consideration five fungicides have been used with varying degrees of success. They are:

(1) Bordeaux mixture.
(2) Ammoniacal solution of copper carbonates.
(3) Eau celeste.
(4) Modified eau celeste.
(5) Flowers of sulphur.

Bordeaux mixture—This preparation should be made as follows: In a barrel that will hold 45 gallons dissolve 6 pounds of copper sulphate or bluestone, using 8 or 10 gallons of water, or as much as may be necessary for the purpose of dissolving. In a tub or halfbarrel slake 4 pounds of fresh lime. When completely slaked add enough water to make a creamy whitewash. Pour this slowly into the barrel containing the copper sulphate solution, using a coarse gunny sack stretched over the head of the barrel for a strainer. Finally, fill the barrel with water, stir thoroughly, and the mixture is ready for use. Prepared in this way, the cost of 1 gallon of the mixture will not exceed 1 cent, estimating the price of copper sulphate at 7 cents per pound and lime at 30 cents per bushel. In all cases it is desirable to use powdered or granulated copper sulphate, as it costs but little more and dissolves much more readily. It is highly important that fresh lime be used. The copper sulphate may be quickly dissolved by tying the necessary amount in a piece of coarse sacking, then suspending the package just beneath the surface of the water in the barrel by means of a string or other simple device. By preparing the copper in this way it will usually be dissolved by the time the lime is ready for use. It has been found a great saving in time, to make up the mixture the night before.

Ammoniacal solution of copper carbonate.—In an ordinary pail mix 5 ounces of copper carbonate with enough water to make a thick paste, dissolve this paste in 3 pints of strong aqua ammonia, then dilute to 45 gallons. If 3 pints of ammonia are not sufficient to dissolve all the paste, add enough to bring about this result. Copper carbonate occurs in the market in the form of a fine, greenish powder. The retail price is usually 60 cents per pound. Aqua ammonia having a strength of 26 degrees retails at 8 cents per pound. Upon this basis 1 gallon of the ammoniacal solution of copper carbonate will cost 1 cent.

In view of the fact that copper carbonate is sometimes difficult to obtain, the following directions for manufacturing it are given:

In a halfbarrel or some similar vessel dissolve 3 pounds of copper sulphate in 2 gallons of hot water. In another vessel dissolve 3½ pounds of common washing soda or sal soda in 1 gallon of hot water. When cool pour the second solution slowly into the first; then, as soon as all action has ceased, add enough water to bring the whole up to 8 or 10 gallons and stir thoroughly. After twenty-four hours pour off the clear liquid, taking care not to disturb the sediment. Add fresh water and stir again. Again allow the solution to stand twenty-four hours, pour off the clear liquid as before and then remove the sediment, which is copper carbonate, Prepared in this way there is formed 1½ pounds of copper carbonate, at an expense for materials of approximately 18 cents per pound. The copper carbonate paste may be immediately dissolved in aqua ammonia, using 2 gallons of the latter, or as much as may be necessary for the purpose. This concentrated fluid should be kept in well-corked jugs, and when ready for use should be diluted at the rate of 1 pint to 12 gallons of water.

Eau celeste.—Dissolve 2 pounds of copper sulphate in 8 gallons of water. When completely dissolved add 3 pints of strong ammonia and dilute to 45 gallons. Prepared in this way the solution will cost about ⅔ of a cent per gallon.

Modified eau celeste.—Dissolve 4 pounds of copper sulphate in 10 to 12 gallons of water and stir in 5 pounds of washing soda or sal soda; then add 3 pints of strong aqua ammonia and dilute to 45 gallons. The cost will be 1½ cents per gallon.

Flowers of sulphur.—This requires no special preparation, being bought in the market ready for use.

With regard to the foregoing, it may be said that Bordeaux mixture, taking all things into consideration, has proved the most efficient and therefore in the end the cheapest fungicide. It will be found equally effective for black rot, downy mildew, brown rot, and anthracnose. Another point of importance in regard to the use of Bordeaux mixture is that it influences the growth of the vine in other ways besides merely preventing the attacks of fungi. In what manner this influence or apparent stimulation is brought about, we are not yet in a position to state. The ammoniacal solution, eau celeste, and modified eau celeste can be recommended only in certain cases, notably when it is desired to make applications near the close of

the season, at a time when a careless use of the Bordeaux mixture might spot the fruit.

The eau celeste will in all cases have to be used with caution, as it is likely to injure the foliage, except in some few favored regions. It may be put down as an unsafe fungicide, and for this reason had perhaps better be left out of consideration entirely.

WHEN AND HOW TO APPLY THE FUNGICIDES.

Before giving directions for the application of the fungicides the importance of keeping the vines in vigorous condition by fertilization and cultivation of the soil, pruning, etc., must be emphasized. In other words, the vines should be aided in every way to resist, as far as possible, the attacks of the many parasitic foes to which they are subject. The careful vineyardist will attend to this, and as a result he will find that the health of his plants may be maintained with much less difficulty.

For the prevention of black rot, make the first application of Bordeaux mixture just as the leaves begin to unfold. When the leaves are one-third grown make a second application of the same fungicide, following with a third when the vines are in full bloom. After this, applications should be continued at intervals of ten or twelve days, until the first signs of ripening are noticed. This will usually be three weeks or a month before the grapes are ready to pick. In no case should the treatment be continued up to the time of harvest, as this is entirely unnecessary, and moreover it is sure to render the fruit unsightly. It is important to bear in mind that in case of dry weather the sprayings should cease.

If it is desired to use the ammoniacal solution or modified eau celeste instead of Bordeaux mixture the applications may be made in the same way as recommended for the latter fungicide. If the ammoniacal solution or modified eau celeste be used at all, it would perhaps be best to apply them toward the latter part of the season, as already suggested, after making the first two or three treatments with Bordeaux mixture.

In regions where black rot, downy mildew, brown rot and anthracnose occur together the treatment recommended for black rot will answer for all. Where downy mildew and brown rot occur alone, and such regions are comparatively few, the first application of the fungicides may be postponed until the fruit is well formed. Anthracnose has proved more difficult to treat than black rot or downy mildew; in fact no thoroughly reliable preventive for this disease has as yet been discovered.

For powdery mildew flowers of sulphur will probably prove the cheapest and most efficient preventive. On the Pacific coast, where, as already pointed out, the parasite in question is most to be feared, the sulphur should be applied from one to three times during the growing season, the number of applications depending on the severity of the attacks of the fungus. The vines should be carefully watched and at the first appearance of the mildew on the lower leaves or fruit, an application of sulphur should be made. If in ten days or two weeks the disease still seems to be on the increase, a second application should be made, followed by a third if necessary. It is customary to make the first application when the shoots are four to six inches long, the second when the vines are in bloom, and the third when the fruit begins to ripen.

Powdery mildew does comparatively little injury in the eastern United States, and for this reason it is doubtful if it would pay to use sulphur, excepting in localities where the vines are not being sprayed with other fungicides. It is believed that where Bordeaux mixture and also the ammoniacal solution are used for black rot and other diseases the powdery mildew will cause very little injury.

As to the methods of applying the fungicides, it may be said that much of the success of the work depends on the thoroughness with which the preparations are put on. In other words, good spraying machines are necessary. In fact the importance of this matter can not be too strongly urged. At this time a spraying outfit should be a part of the equipment of every fruit grower, or, as is no doubt frequently the case, a number of growers might combine and purchase such a machine and use it in common.

It has been pointed out in various publications (Farmers' Bull. No. 7, U. S. Dept. of Agr., and others) by the writer that a sprayer to be effective requires first of all a good strong force pump. Next in importance is a nozzle that will throw a mist-like spray and will not clog when thick fluids are used. There are plenty of machines on the market filling all these requirements. For convenience they may be divided into three classes: (1) horse-power automatic machines; (2) machines drawn by horse power, but operated by hand; and (3) hand machines. All belonging to the first group are unnecessarily expensive and complicated, and will not do the work as thoroughly and effectively as the machines belonging to the second and third groups. Of the second group, in which the cheapest and most practical and efficient example is found in a strong, light, double-acting

double-discharge force pump, mounted on a barrel, it may be said that while they can not do the work as rapidly as the machines of the first class, they are more effective, much cheaper, and far less wasteful of the liquid used.

To the third class belong the knapsack sprayers, which are the only ones necessary to notice in this connection. There is no question that for all moderately low-growing crops the knapsack sprayer fills every requirement. In no other machine is the work so absolutely at all times under control, it being possible to place nearly every drop of the liquid exactly where it is needed. Knapsack pumps are now used in many moderate sized vineyards, also in places where the horse-power apparatus, owing to the nature of the land or the manner of cultivation, can not be utilized.

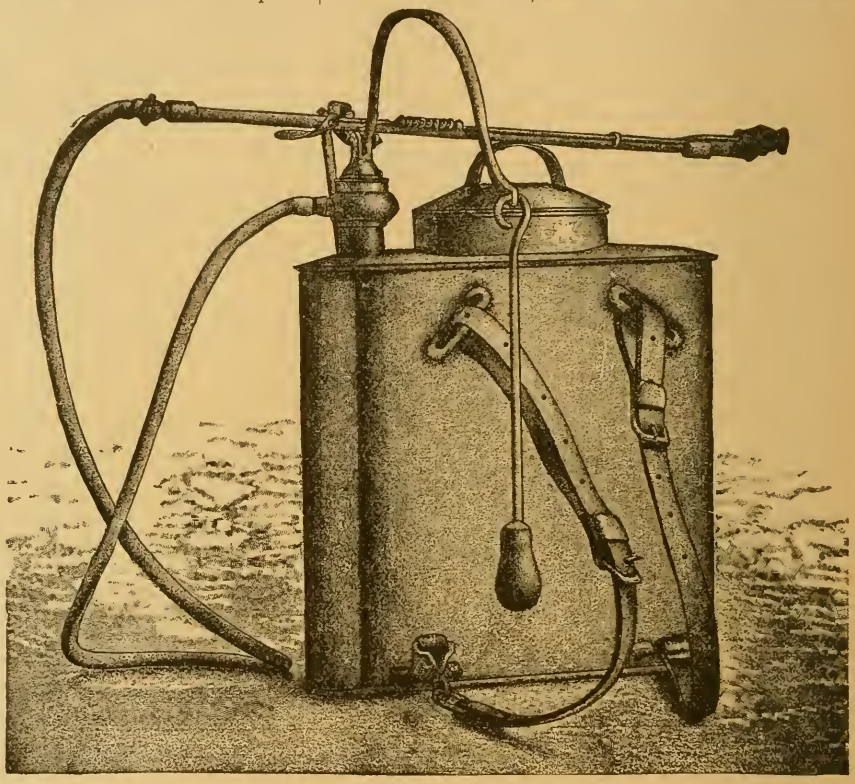

Fig. 80.—Knapsack Sprayer.

Many firms throughout the country (as will be seen by referring to the advertising columns of agricultural papers) are engaged in the manufacture and sale of the various machines mentioned.

For applying sulphur various devices are in use. Probably the simplest is that employed by the grape growers of California, i. e., a tin can holding about a gallon, provided at the top with a strong, rigid handle, and having the bottom punched full of small holes. Owing to the manner in which the vines are trained, two rows can be treated at a time by one man. A can containing sulphur is simply held in each hand and given a slight twist over a vine in each row. This scatters the sulphur over the entire plant and the operator then passes to the next two vines. Of course this plan could not be followed in the East, owing to the way in which the vines are trained. Various styles of sulphuring bellows have been designed for this work, but it is beyond the scope of this paper to enter upon a discussion of this class of apparatus.

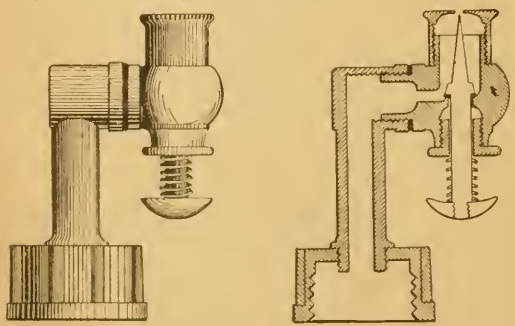

Fig. 81.—Improved Vermorel Nozzles.

CONCLUSIONS.

In conclusion, the importance of exercising care in making the treatments should again be emphasized. The work if it is worth doing at all is worth doing well; therefore every precaution should be taken in the preparation and application of the fungicides. With the exercise of judgment there is no reason why the work can not be made a success, and fine, luscious fruit grown where a few years ago such a thing was out of the question.

VITICULTURAL REMARKS

ABOUT MILDEW AND ROT.

The foregoing articles on the diseases of the grape and their treatment, need no further explanation nor commendation to our grape growers. They should be carefully studied by every one and its lessons perseveringly practiced; but after a few years the ills which we, old Viticulturists, had suffered, will be almost forgotten. The following remarks may, therefore, be both interesting as a historical record of these sufferings,—laments of the past and hopes for the future,—and may be useful as incentives to persevere in the struggle against these diseases.

In 1849 Longworth, of Cincinnati, O., wrote of his old Vine dresser, father Ammen, that he became dispirited, as the *rot* blasted his hopes: he got sick, refused to take medicine, saying "what do I want to live for? My grapes all rotten." And in a communication of Longworth to a committee on fruits, in 1848, he said: "previous to the last six or eight years we had much less of rot." Grape growing was almost abandoned around Cincinnati, where it first flourished, and would have been deserted had its success depended on the Catawba and Isabella alone, as it did center for years on these two varieties. The introduction of others, especially the *Concord*, which was supposed to be entirely *free* from rot and mildew, gave a new impetus to grape growing, and it promised again to become one of the great industries of our country, a source of wealth and enjoyment to its thousands of producers and consumers. A few years experience has unfortunately shown that the Concord, and in fact all our grapes, with very few exceptions, perhaps, are more or less subject to these diseases, and if some varieties were to-day yet exempt, we could not have faith in their future freedom from these diseases, which had increased in violence, destructiveness and extent of territory to such a degree as to justify almost despondence among grape growers.

In 1861 the late Dr. Engelmann, of St. Louis, gave us the first scientific description of the two species of fungi which infect our vineyards to so large an extent,—but though "the direct destruction of the fungus has been often attempted, and by different means, especially by sulphur sprinkling, it was without any marked effect. In 1875 the senior of our firm, Isidor Bush, corresponded with the then U. S. Commissioner of Agriculture (Hon. Wm. G. Le Duc) asking for the earnest investigation of this disease, through men skilled in microscopy and chemistry and aided by fruit-culturists; the Commissioners promised "to grapple with this question, so as to discover as speedily as possible the cause of and remedy for the rot."—In the Department of Agr. Report for 1877 you can find an article by Wm. McMurtree, chemist in chief; but after studying that, you would know but little more about it than that both mildew and rot are fungous diseases caused by atmospheric influences. We had to look on and wonder, powerless—knowing

> "That the bright hopes of to-day
> May be dispelled by next morn!!"

but not knowing how to prevent or cure the pest.

The fact that there were some places exempt from the disease, while others,—quite near by,—had almost the entire crop of grapes destroyed, gave rise to a number of theories, doctrines, speculations and suggestions, all of which proved delusive, based on false presumptions. Young vines planted on virgin soil, old vines, whether richly manured or growing on poor land, were attacked alike in some and uninjured in other localities, and all claims for some certain modes of training and pruning were unfounded.

A paper on this subject, by Bush, read before the American Pomological Society in September, 1879, (pp. 41–48), was followed by Bateham of Ohio, the editor of the Ohio Farmer, secretary of the Ohio Pomological Society and State Board of Agriculture, (died August 5, 1880); he said: Referring to the essay that had just been read, the results of his thirty years of observation accorded in the main with those of his friend, Mr. Bush. It is evident that the causes of grape rot are *atmospheric*, and not any disease or debility of the vine, or defect of the soil, or error of cultivation. There are in Ohio, said Mr. Bateham, an aggregate of about ten thousand acres of vineyard, and in his opinion the crops of one-third of these on an average have been destroyed by the rot, each season for five years past, and in consequence of repeated failures not less than a thousand vines per year have been grubbed up the past five or six years. At the same time about half as many acres of new vines have been planted annually on the lake shore and islands, which have escaped the disease—so that grape-growing seems likely hereafter to be confined to these favored localities.

But what should the poor vintners do who live outside of these few blessed locations, exempt, we hardly knew why nor for how long? All the aid and advice we could give and have given in the previous edition (1883) of this catalogue was, to tell our grape-growers in a table, based on many years' experience, which principal varieties are generally less liable to MILDEW (*peronospora*); and as this table may still be of some service,* having proved correct and reliable ever since, we reprint it:

TABLE OF AMERICAN VINES (PRINCIPAL VARIETIES) WITH REGARD TO THEIR RESISTANCE TO MILDEW (*Peronospora*).

I. CATEGORY: almost entirely exempt, even in unfavorable seasons and localities.
Æstivalis, Northern Division: Cynthiana, Norton's Virginia.
Labrusca: Concord, Hartford, Ives, Perkins; also, Champion, Cottage, North Carolina, Rentz, Venango.
Riparia and its crosses with Labr.: Elvira, Missouri Riesling, Montefiore, Noah, Taylor.

II. CATEGORY: suffering somewhat in exceptionally unfavorable seasons and localities.
Æstivalis, Southern Division: Cunningham; Northern Division: Hermann, Neosho.
Labrusca: Dracut Amber, Lady, Martha, N. Muscadine, Telegraph, Mason's Seedling.
Riparia and in its crosses with Labr.: Black Pearl, Blue Dyer (Franklin), Clinton.
Hybr., Labr. and Vinifera. Goethe.

III. CATEGORY: suffering seriously in unfavorable seasons, and *not recommendable for localities usually exposed to mildew.*

*"Quelqes Observations sur le Mildew, par G. E. Meissner," at the Congrès International de Bordeaux.

Æstivalis, Southern Division: Devereux, Herbemont, Lenoir, Louisiana, Rulander.
Æstivalis crossed with Vinifera (?) Alvey.
Labrusca: Catawba, Diana, Isabella.
Riparia crosses with Labr.: Amber (Rommel's), Marion, Uhland.
Hybr., Labr. and Vinifera, Labr. and Hybr., and Vinif. with Rip.: Black Eagle, Brighton, Brandt, Herbert, Lindley, Triumph, Wilder.

IV. CATEGORY: suffering seriously even in normal seasons; *entirely unreliable*, except in some few favored localities, which are *free* from mildew.
Æstivalis: Elsinburg, Eumelan.
Labrusca: Adirondac, Cassady, Creveling, Isabella, Iona, Mottled, Maxatawney, Union Village, Rebecca, Walter.
Undetermined Class: DELAWARE.
Hybr. of *Vinif.* and *Labr.:* Agawam, Allen's hybr., Amenia, Barry, Black Defiance, Croton, Irving, Massasoit, Merrimack, Salem, Senasqua.
Hybr. of Vinif. and Rip.: Autuchon, Canada, Cornucopia, Othello.

Varieties not sufficiently tried, and especially new varieties we would not presume to classify; but one may safely judge of their resistance to mildew by their parentage.

As to rot: The only variety *never* attacked by this fungus is the Delaware, which suffers, however, the more from mildew. Norton's, Ives and Perkins were in some localities long considered quite exempt from rot, but were also found in others more or less subject to it. Suggestions such as planting vineyards on high open positions, with perfect drainage, allowing plenty of room on the trellis, to keep soil and roots as dry as possible and secure free access of sun and air; mulching the soil to prevent an excess of heat; and other suggestions were not very practicable, except on a small scale and seemed even then of no practical advantage in diminishing the disease; sulphuring, very successfully applied in Europe against powdery mildew (Oïdium) proved no remedy against downy mildew (Peronospora) nor against rot; a coping, a canopy of boards or canvas, over the trellis is no protection, nor was it recommended against rot.

Neither remedy nor preventive seemed possible, and before these were discovered we were dismayed. The following quotations from high viticultural authorities will show the seriousness of the evil and its effect on grape culture:

ALEX. W. PEARSON of Vineland, N. J., a man whose knowledge and long experience entitles his word to great weight in this matter, said: "The foliage is destroyed by the mildew and the fruit is ruined by the black rot. Grape culture may be called a failure in this region on account of these diseases. Various remedies for these evils have been tried with but little success."

GEO. W. CAMPBELL of Delaware, Ohio—whom all veteran grape-growers know, love and honor—said in 1885: "The great obstacles in the way of improvement of our American grapes are: Mildew of the foliage, rotting of the fruit and tenderness of the vine in severe winters."

PROF. T. J. BURRILL of the Illinois University, stated in 1885: "Our knowledge of the fungi, which destroy the grapes to so great an extent in this country, has not been materially increased during the few years past."

JACOB ROMMEL of Morrison, Mo., the originator of the Elvira, a plain, yet most eminent and devoted vintner, said:* "The rot in grapes has been most fatal, and has been on the increase from year to year. Concord is, in many places, for last years, a failure by rot; this and many of the old kinds, when first introduced, have for years proved almost exempt from rot, likewise many of our newer kinds. All appear to share the same fate in time, with the exception that some will resist it longer than others. There have been tried many remedies for preventing rot, but so far all have failed, except to cover the vines over head or to run them under eaves; this, however, is too expensive. At the same meeting a letter of excuse from our junior, G. E. MEISSNER was read, saying: "I had no heart to make a report, which in itself could have reported but little else besides failure of crops."

And as late as 1889, B. T. GALLOWAY, *now* chief of Division of Vegetable Pathology, United States Department of Agriculture, stated: "Downey mildew and black rot prevail more or less seriously in all of the States east of the Rocky Mountains, and despite of the fact that for many years they have annually destroyed from one-half to three-fourths of the crop, no organized effort has until within the last three years been made to combat them."

We were, naturally, somewhat discouraged, nevertheless we were persevering in the work, not without hope that some remedy will be found; and we expressed this hope in the third edition of this catalogue, 1883 (page 49), in the following words: "Eminent scientists will now occupy themselves with this serious question," adding: "We have now before us an 'Essay sur le Mildion par A. Millardet, Professeur de la Faculté des Sciences à Bordeaux; Paris, 1882.' He suggests as a remedy 'a mixture of powdered sulphate of iron, copperas (4 lbs.), with plaster of paris, gypsum (20 lbs.), which according to reports was applied with marked success.'" At the Missouri State Horticultural meeting, held at Warrensburg December, 1885, our G. E. Meissner, lately returned from a visit to Europe, said: "Happily the hope expressed two years ago by my friend and partner, Bush, seems now to have been realized," and he gave an extract of several articles just then published in the Message Agricole, at Montpellier, France, "On the Treatment of Rot and Mildew," by Prof. Millardet, of Bordeaux. It was the same as is now recommended, somewhat improved, after extensive trials and tests, in Prof. Galloway's article (page 56 of this catalogue). Friend Meissner reported at the same time (Missouri Horticultural Report, 1885, p. 199) another remedy, applied with remarkable success in Italy, consisting simply of a lime wash, or "lime milk," prepared in the proportion of 2½ kilos (about 5¼ lbs.) of fresh lime slaked in 100 litres (26½ gallons) of water. With this liquid the vines were sprinkled abundantly, and from the middle of May until the middle of August this operation is repeated five or six times. Vines so treated, which were formerly ravaged by mildew (Peronospora), were now reported exempt from it, to have conserved all their leaves and of a dark green color. Now, if it should prove equally efficacious here, the

* Missouri State Horticultural Society, meeting at Lexington, Mo., December, 1886.

Delaware, very rarely subject to rot, while it is very susceptible to mildew, would be one of our most valuable and profitable grapes to grow.

Thus we both said: Let us not despair of grape culture; let us hope that the remedies discovered will prove of great service as preventives against the diseases of our grape.

Was our hope not well founded? Let us hear what the very eminent grape-growers, whose lament we quoted, say to-day.

Alex. W. Pearson, of Vineland, N. J., writes us (January 8, 1894), referring to his "Ironclad": (see description) "rot-proof quality is not so important now, since our discovery of success in *spraying*, to prevent grape rot. I can hardly add any to the information on the subject, published by the Department of Agriculture, unless it be *to approve* the Bordeaux mixture, applied early and thoroughly to the vine."—"The time to prevent grape rot is by the spraying of the vine *before it blooms* and *when it is in bloom*. My spraying is all done before the grapes are larger than No. 4 shot."—"With the *Bordeaux* thus used my success the past two years has been *complete*, as against grape *rot*, but not so good versus *mildew*." "However, full fertilization with *ashes*, lime and *nitrate soda* will enable vines to do well enough against mildew."

Hermann Jaeger, of Neosho, Mo., reported to our State Horticultural Society: "More than ninetenths of the varieties usually mentioned in the catalogues of our nurserymen had proven unprofitable here, owing to rot or mildew, or both of these fungus diseases. Now we can grow them to perfection. Three years' spraying has secured me fine crops of about fifty varieties of grapes that I had been considering utterly worthless. Four years ago my Delaware vines were almost killed by mildew. Since then I have sprayed them regularly. They improved every season, kept their foliage till frost, and now make a finer growth of wood and produce more and better grapes than ever before. . . . Both black rot and mildew are under our control, and if we continue to have our grape crops ruined by these pests it is our own fault."

George W. Campbell, as President of the Ohio State Cultural Society, said last fall (1893), in an address delivered before the students of agriculture: "I can hardly close without referring to the alarming and discouraging encroachments of fungus diseases, which have in many places destroyed our grapes as well as other cultivated fruits. I feel that we owe a debt of gratitude for the labors of scientific men in our colleges and experiment stations for their careful investigations and discovery of remedies to meet and successfully combat these insidious destroyers. Through the agency of their beneficent efforts we may hope to grow our grapes and other fruits still nearer perfection and also to raise successfully many of the finer varieties, which have been hitherto prevented by reason of being more susceptible to the attacks of parasitic fungi."

After such testimony it would be useless to add more, though we could fill many pages with them.*

We will close, however, with some important remarks by that practical and careful experimenter and observing grape-grower, Hermann Jaeger: "Nothing could have pleased us better than the fact established after three years' experimenting with copper remedies, under the direction of our National Department of Agriculture, the fact that not only mildew, but likewise the still more fatal pest of black rot, are under our control, and can both be entirely prevented by *correct* spraying with Bordeaux mixture and the other copper solutions. . . . Last summer it required from five to eight sprayings to keep our vines free from rot and mildew. A neighbor of ours, who postponed his spraying because the incessant rains would be sure to wash off the solution, made almost a complete failure, as another neighbor, who argued spraying was useless until dry weather had set in, because 'the rain would wash away all rot and mildew from the fruit.' Just such mistakes as these are to blame for all failure in spraying grape-vines, for wherever fruit and foliage are covered with a copper solution, the germination of the spores or seeds of the fungi causing rot and mildew is impossible. But just as impossible it is for any spray to be of the least benefit if applied after this germination has taken place. When by naked eye we can discover the least trace of mildew or rot, it proves that we should have commenced spraying at least ten days before." The way to prepare and apply the sprays is fully and ably described in the preceding article, written for this catalogue by B. T. Galloway, the chief of the Division of Pathology of the United States Department of Agriculture—while the two small cuts, representing: "*Grapes without and after treatment*" may be conspicuous object lessons, which everyone of our grape-growers will recognize.

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*And yet, we have no doubt that the ever active efforts of man, scientists and practical viticulturists, will discover new, and perhaps, more effective remedies. But we would warn against experimenting with any which may be introduced and advertised by interested manufacturers only, or praised by over sanguine inventors. Hundreds of such pretended remedies have been tried and proved worthless, or at least not near as effective and reliable as the Bordeaux mixture. It is therefore merely as a matter of latest information without recommendation that this catalogue reports the following:

In an article published in the "Vigne Americaine" of June, 1894, also in the "Messager Agricole" of July, 1894, (*quelques reflexions sur le traitement du mildew par les sels de cuivre*), reviewing the different copper salt solutions which are employed by the French vineyardists, preference is given to one prepared by a solution of powdered Acetate of copper (refined) called "verdet neutre." It is said to have made for itself an important place in the vineyards of France, to the detriment of the other processes adopted in the different regions. The verdet neutre is the strongest (most toxique) of all copper salts; its destructive action on the fungus, which forms the base of the disease, shows itself rapidly. The complete solubility of the verdet neutre facilitates its penetration in the tissue of the leaves, which explains the rapidity of its action. The treatment with this copper salt does not only arrest the disease, but causes its prompt disappearance, by destroying the germs of the evil. It is harmless to the vegetable organic tissue; one has to fear no burning or scalding of the leaves, as in some other copper preparations. The manner of preparing the solution of verdet neutre is quite simple; it dissolves in cold water, by simply stirring it for five or six minutes with a stick; the fine and light powder is reduced to a very small volume, but by its nature is very powerful, because all that enters into its chemical constitution contributes to the destruction of the parasite. The ease of the treatment is surprising, because of the facility of preparation and application of verdet neutre. If at first appearance its price seems high, one will see quickly that, because of the small quantity necessary, one realizes rather a saving. On the other hand the considerable saving in labor, the dispensing of incidental expenses connected with the preparations in the other methods, are items which should be kept in view in calculating the total cost.

Verdigris (or verdet neutre?) has been pretty thoroughly tried in this country and has not proved as efficient as Bordeaux mixture. Another curative solution "*Vini Vitine*," lately discovered in this country, by Dr. L. C. Chisholm of Tennessee is confident y looked upon by him; but he will not introduce it nor offer any for sale before it will be fully tested and reliably endorsed.

BLACK ROT.

WITHOUT TREATMENT.

AFTER TREATMENT.

For those who desire to grow fine grapes for table use, or for exhibition,

SACKING OR THE BAG METHOD OF PROTECTING GRAPES

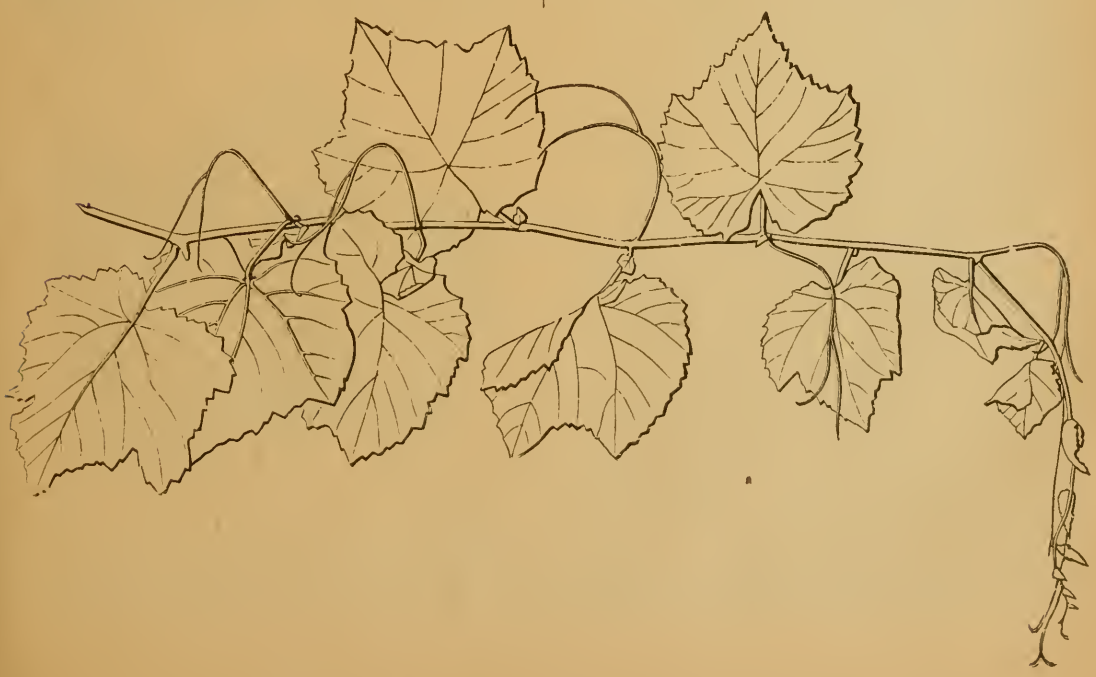
should be mentioned. Common manilla paper bags, as used by grocers, about 6 inches wide and 9 inches deep, are put over the bunches before they are half grown, and are fastened by two pins. They should also have a small slit in the bottom, to let water run through it. The cost of bags, pins and labor is about ½ a cent per bag, and is well repaid by the result. Others found a better protection from insects, birds and diseases, in covering each bunch of grapes with a bag made of cheap crossbar mosquito netting. This kind of bag is slipped over the bunch and tied around the stem with a string; it interferes less with the natural coloring and perfect ripening of the fruit. In France a specially prepared net-bag is made for this purpose, which is stronger than mosquito net, keeps its shape better, and is far more durable—sufficiently open to admit air and partial sunlight, affording perfect protection against birds, and with all other advantages, which paper bags could have, without their objections. We used both and found them excellent where fine grapes are appreciated.

SACKING, says our friend *Samuel Miller*, seems a sure prevention against rot and mildew, also against insects and birds; this is also a way to prolong the season. In paper sacks grapes will remain sound and fresh on the vines until several degrees of frost has occurred. Further: to secure the grapes from birds and insects, sacking is the only good plan; but the rot can be kept off, I believe, by simply covering the bunches on top by CANOPIES. Take a piece of pretty strong paper, cut out a circle according to the size of the bunches to be covered; cut out a triangle and pin its edge lapping over the other, so that it will have the shape of an umbrella. Tie the part around the stem and pin fast. I tried this plan and found the fruit so protected, perfect, while all around the fruit left exposed rotted.

J. S. Newman, Vice-President American Pomol. Society for Alabama, says: "I tested the value of paper sacks as a protection from rot. In every case (some 7,000 sacks) it was a complete protection if the sacks were put on as soon as the grapes set. The sacks are also a protection against birds and insects, besides prolonging the season on some varieties two to three weeks, thus enabling us to sell for a better price."

Jacob Rommell, the well-known originator of *Elvira*, wrote us: "My success in bagging has been gratifying; removing first or thinning out, leaving but two best clusters remain on each shoot, having less to bag but getting larger clusters. I find paper bagging the best protection; however, it must be done early in the season, say just before blooming time. I have bagged some at the right time, and such were free from rot and very fine; while I bagged some later, after blooming was over, which rotted badly in the bags. This proved that the black rot is produced in the early part of the season. There are many reports of failure in spraying and paper-bagging against black rot, which is undoubtedly due to not making the application early enough. If we wish to control black rot it must be done *early*; later it has but little or no effect. The work is so easy, most any one can do it, and the expense is nominal compared to the result: the production of fine, large bunches, weighing one pound or more, without any defect and with a beautiful bloom; and besides, the paper-bagged grapes will remain fresh, in perfect condition longer after ripe, than grapes not so protected. Such has been my experience, and it deserves to be put into general practice."

In conclusion, let us hear and take advice of one of *the best* living authorities, P. J. Berckmans, of Georgia, the President of the American Pomological Society, etc., who says: "*Bagging grapes* we have found an indispensable adjunct to successful grape-growing. This with a liberal use of various fungicides as a spray has removed many of the drawbacks heretofore existing."



INSECTS.

[Our limited space only permits us to briefly refer to a few of those insects which we have found most injurious in our vineyards and to some of the beneficent insects which the grape-grower will meet with. Both are, however, for the most part unnoticed in any of our standard treatises on the grape-vine, and for the facts regarding them we are indebted to Prof. C. V. Riley's valuable "Entomological Reports."]

The Grape Phylloxera.

(Phylloxera vastatrix).

Among the insects injurious to the grape-vine none have ever attracted as much attention as the Phylloxera, which, in its essential characteristics, was unknown when the first edition of our little work on American Grape-vines was written. The gall-inhabiting type of this insect, it is true, was noticed by our grape-growers many years ago (especially on the Clinton), but they knew nothing of its root-inhabiting type. Even Fuller —who informs us that in Mr. Grant's celebrated grape nurseries (as far back as 1858) the men were in the habit of combing out, with their fingers, the roots of young vines to be sent off, in order to get rid of the knots—never mentions anything of this, nor of any root-infesting insect, in his excellent Treatise on the Cultivation of the Native Grape, though 16 pages are devoted to its insects. In the spring of 1869, M. J. Lichtenstein, of Montpelier, first hazarded the opinion that the Phylloxera, which was attracting so much attention in Europe, was identical with the American Leaf-gall Louse (first described by Dr. Asa Fitch, State Entomologist of New York, by the name of *Pemphigus vitifoliæ;*) and in 1870, Prof. C. V. Riley succeeded in establishing the identity of their gall insect with ours, and also the identity of the gall and root-inhabiting types. The correctness of his views is confirmed by the subsequent researches of Professor Planchon, Dr. Signoret, Balbiani, Cornu and other scientists in France; lately also of Professor Roessler, in Klosterneuburg in Austria.

After visiting France in 1871, and then extending his observations here, some of which were made in our Bushberg vineyards, Professor Riley first gave us every reason to believe "that the failure of the European vine (*V. Vinifera*) when planted here, and the partial failure of many hybrids with the European *Vinifera* are mainly owing to the injurious work of this insidious little root-louse; also, that some of our native varieties enjoy relative immunity from the insect's attacks"—M. Laliman of Bordeaux, having previously noticed the remarkable resistance of certain American vines in the midst of European vines dying from the effects of Phylloxera. The importance of these discoveries to grape culture cannot be too highly appreciated. The French Minister of Agriculture commissioned Professor Planchon to visit this country in order to study the insect here—the harm it does to our vines, or the power of resistance which these possess. His investigations not only corroborated Prof. Riley's conclusions regarding the Phylloxera, but gave him, and through him the people of Europe, a knowledge of the quality of our native grapes and wines, which dispelled much of the prejudice against them that had so universally prevailed heretofore.

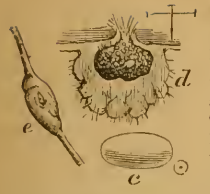
Prof. Riley's recommendations to use certain American vines, which he found to resist Phylloxera, as stocks on which to grow the more susceptible European vine, induced us to send a few thousand plants and cuttings, gratis, for testing, to Montpellier, France, and the success of these resulted in an immense demand for the resistant varieties. With the spread of the Phylloxera to other countries, including South America, Australia, South Africa, nearly every part of the world which deals in or grows European vines, the demand for these resistant stocks has continued and they have been propagated to a large extent almost exclusively for this purpose not only in this country but in France and elsewhere. It is characteristic of Prof. Riley that, though the first requests for such resistant stocks came to him, and though he was urged, as we know, by prominent growers to join in a business enterprise, the possibilities of which he fully recognized, he declined every such offer, and has never profited financially from his discoveries, preferring the honor of unselfish devotion to science to material gain.

To discuss this subject as it deserves; to give a history of the grape Phylloxera—the progress and extent of its ravages—the experiments made to prevent these; to review the influence which it had and probably will have on American grape culture, would far exceed the scope of this brief manual. The literature of this subject would fill a respectable library. We can here merely mention a few facts, and give some figures, which may enable the grape-grower to recognize and observe this minute, yet so important insect; and we refer those who desire full and reliable information to Prof. Riley's Entomological Reports, from which we cull largely. It will be understood that the figures, which are from the same reports and which were made by Prof. Riley from nature, are generally very highly magnified, and that the natural sizes are indicated by dots within circles, or by lines.

The following figure of a grape-leaf shows the galls or excrescences produced by the gall-inhabiting type of the insect. On carefully opening one of the galls, we find the mother louse diligently at work surrounding herself with pale yellow eggs, scarcely (.01) the one-hundredth part of an inch long, and not quite half as thick.

Under side of Leaf covered with Galls, nat. size.

She is about .04 inch long, of a dull orange color, and does not look unlike an immature seed of the common purslane. The egg begin to hatch, when 6 or 8 days old, into active little beings,



TYPE GALLICOLA: *c*, egg; *d*, section of gall, enlarged; *e*, swelling of tendril, nat. size.

which differ from their mother in their brighter yellow color, more perfect legs, etc. Issuing from the mouth of the gall, these young lice scatter over the vine, most of them finding their way to the tender terminal leaves, and commence pumping up and appropriating the sap, forming galls and depositing eggs as their immediate parent had done before. This process continues during the summer, until the fifth or sixth generation. Every egg brings forth a fertile female, which soon becomes wonderfully prolific.

By the end of September the galls are mostly deserted, and those which are left appear as if infected with mildew, and eventually turn brown and decay. The young lice attach themselves to the roots, and thus hibernate. It is an important fact that the gall-inhabiting insect occurs only as an agamic and apterous female form. It is but a transient summer state, not at all essential to the perpetuation of the species, and does, compared with the other, or root-inhabiting type, but trifling damage. It flourishes mostly on the *Riparia*, more especially on the Clinton and Taylor; its galls have also been noticed on many other varieties. In some seasons it is even difficult to find a few galls on the very vines on which they were very abundant the year before.

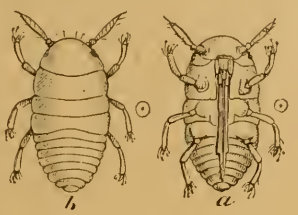


Fig. 82. NEWLY HATCHED GALL-LOUSE: *a*, ventral; *b*, dorsal view.

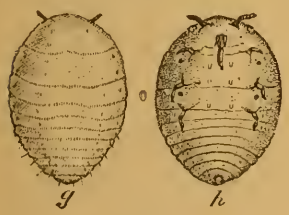


Fig. 83. MOTHER GALL-LOUSE: ventral and dorsal views.

The root-inhabiting type of the Grape Phylloxera hibernates mostly as a young larva, attached to the roots, and so deepened in color generally as to be of a dull brassy brown, and therefore perceived with difficulty, as the roots are often of the same color. With the renewal of vine-growth in the spring, this larva moults, rapidly increases in size, and soon commences laying eggs. These eggs, in due time, give birth to young, which soon become virginal, egg-laying mothers like the first, and, like them, always remain wingless. Five or six generations of these egg-bearing mothers follow each other, when, about the middle of July, in the latitude of St. Louis, some of the individuals begin to acquire wings, and continue to issue from the ground until vine-growth ceases in the fall. Having issued from the ground while in the pupa state, they rise in the air and spread to new vineyards, where they lay from three to five eggs, and then perish. In the course of a fortnight these eggs, which are of two sizes and are deposited in the crevices on the surface of the ground, near the base of the vine, and upon the leaves, especially on the under side, produce the sexual individuals, which are born for no other purpose than the reproduction of their kind, and are without means of flight or of taking food. They are, however, quite active and couple readily. The males coming from the smaller and the females from the larger eggs.

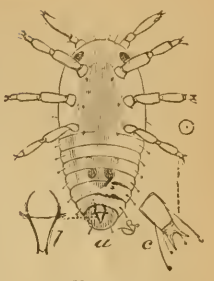


Fig. 84. MALE PHYLLOXERA: ventral view.

The female lays a single egg, which has been called the "winter egg," from the fact that it generally passes the winter unhatched. It is generally hidden in the crevices and under the loose bark of the older wood, but may also be laid in other situations, and even on old leaves on the ground, It is distinguished from all the other eggs produced by other forms of the insect in that it has an olive-green hue and a short pedicel at one end. There hatches from it the "stem-mother," which either goes directly on to the roots to found a root-feeding colony, or more often founds a gall-inhabiting colony on the leaf, the gall-inhabiting form always issuing from such winter eggs.

Every piece of root having rootlets taken from an infected vine during August or September will present a goodly proportion of pupæ, and a glass jar filled with such roots and tightly closed will daily furnish, for some time, a dozen or more winged females, which gather on the side of the jar toward the light. We may gather some idea from this fact, of the immense number that disperse through the air to new fields from a single acre of infected vines, in the course of the late summer and fall months. We have, therefore, the spectacle of an underground insect possessing the power of continued existence even when confined to its subterranean retreats. It spreads in the wingless state from vine to vine and from vineyard to vineyard, when these are adjacent, either through passages through the ground itself, or over the surface; at the same time it is able, in the winged condition, to migrate to much more distant points.

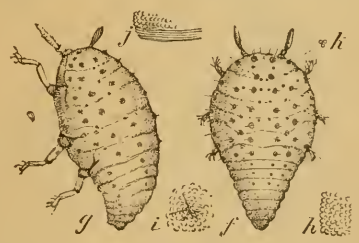


Fig. 85. TYPE RADICOLA: showing the tubercles by which it is distinguished from *Gallicola*.

If to the above account we add that occasionally individuals, under certain conditions, abandon their normal underground habit, and form galls upon the leaves of certain varieties of grape-vines, and that under certain conditions the root-inhabiting form may propagate for several years without producing the aerial or winged form, we have in a general way the natural history of the species.

The annexed figure (86) shows the abnormal swelling of the rootlets which follows the puncture of the root-louse; they eventually rot, and the lice forsake them and betake themselves to fresh ones. As these decompose, the lice congregate on the larger parts beyond, until at last the root-system literally wastes away.

During the first year of attack there are scarcely any outward manifestations of disease; only the second and third year—when the fibrous roots have vanished, and the lice not only prevent the formation of new ones, but settle on the larger roots, which also eventually become disorganized and rot—do the outward symptoms of the disease become manifest in a sickly, yellowish appearance of the leaf, and a reduced growth of cane; and the vine dies. When the vine is about dying, it is generally impossible to discover the cause of the death, the lice having previously left for fresh pasturage.

As is frequently the case with injurious insects, the Phylloxera shows a preference for and thrives best on certain species, and even discriminates between varieties, or what amounts to the same thing, practically, some species, or varieties, resist its attacks, and enjoy relative immunity from its injuries. A knowledge of the relative susceptibility of different varieties to the attacks and injuries of the insect is therefore of paramount importance.

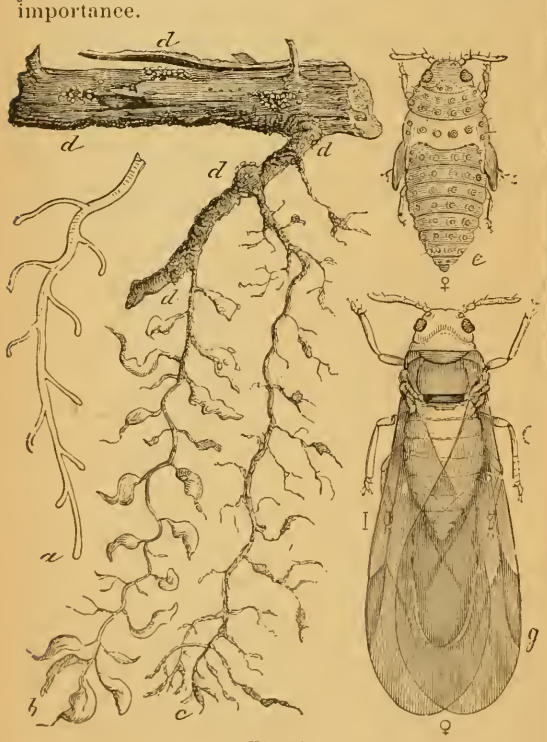


Fig. 86.

TYPE RADICICOLA: *a*, shows the healthy root; *b*, one on which the lice are working, representing the knots and swellings caused by their punctures; *c*, a root that has been deserted by them, and where the rootlets have commenced to decay; *d*, *d*, *d*, show how the lice are found on the larger roots; *e*, female pupa, dorsal view; *g*, winged female, dorsal view.

Most American varieties, indeed even the most susceptible, resist the insect, provided they are in locations suitable as to soil and climate.

We see in the general resistibility of our purely native American vines against the Phylloxera, a remarkable verification of that law which Darwin has so ably established and aphoristically expressed, as "THE SURVIVAL OF THE FITTEST."

Prof. Riley, in explaining "why the insect is more injurious in Europe than here," says: "There exists a certain harmony between the indigenous fauna and flora of a country: and our native vines are such as, from their inherent peculiarities, have best withstood the attacks of the insect. The European vine, on the contrary, succumbs more readily, not only because of its more tender and delicate nature, but because it has not been accustomed to the disease—there being, doubtless, a parallel between this case and the well-known fact that diseases and parasites which are comparatively harmless among peoples long accustomed to them, become virulent and often fatal when first introduced among hitherto uncontaminated peoples. Then the particular natural enemies of the insect which belong to its own class, and which in this country help to keep it within bounds, are lacking in Europe; and it will require some time before the closely allied European predaceous species will prey upon and check it there to the same extent. The Phylloxera will, also, all other things being equal, have an advantage in those countries where the mildness and shortness of the winter allow an increase in the annual number of its generations. Finally, the differences in soil and in modes of culture have no insignificant bearing on the question in hand. Though Phylloxera, in both types, is found on our wild vines, it is very doubtful if such wild vines in a state of nature are ever killed by it. With their far-reaching arms embracing shrub and tree, their climbing habit unchecked by the pruner's knife, these vines have a corresponding length and depth of root, which render them less susceptible to injury from an under-ground enemy. Our own method of growing them on trellis approaches more nearly these natural conditions than that employed in the ravaged French districts, where the vines are grown in greater proximity and allowed to trail upon the ground, or are supported to a single stake."

Again, after speaking of the large numbers of winged females rising from the ground during late summer and fall, he adds: "The winged migrant Phylloxera is wafted about, and will lay her eggs, or, in other words, deliver herself or her progeny, wherever she happens to settle. If this be upon the grape-vine, well and good—the young live and propagate; if upon other plants, they perish. We thus have the spectacle of a species annually wasting itself away to a greater or less extent, just as in the vegetable kingdom most species produce a superabundance of seed, the larger portion of which is destined to perish. Thus in the thickly planted wine districts of France few winged insects would fail to settle where their issue could survive, while in America an immense number annually perish in the large tracts of other vegetation intervening between our vineyards."

Under the stimulus of a large reward (300,000 francs) appropriated for the purpose by the French Government, innumerable plans have been proposed and experiments made, but *no remedy* has yet been discovered which gives entire satisfaction, or is applicable to all conditions of

soil.* Submersion is an efficacious remedy, but to be effective the field must be covered with water one foot deep during eight weeks, November and December being considered the proper period; a less complete submersion is useless, and on most and especially on the best hilly vinelands such submersion is impracticable. A large admixture of sand in the soil is also of service, as the root-louse does not thrive in sandy soils. This was first discovered by LICHTENSTEIN; and as a result of this discovery the sandy borders of the Mediterranean coast (Aigues mortes), where formerly scarcely poor grass grew, are now, in many places, changed into beautiful vineyards, of great value. Sulpho-carbonate of potassium and coal-tar are mentioned as capable of destroying the Phylloxera, and Mr. Marés, in his Ministerial report on the various (140) modes of treatment tried, stated that manures rich in potash and nitrogen, mixed with alkaline or earthy sulphates, refuse of salt-works, soot, wood ashes, ammonia, or fat-lime, have given the best result. Bisulphide of carbon is also effective when judiciously applied, and Prof. Riley has proved that Kerosen-emulsion is one of the most effective remedies. Prof. Roessler also believed in fighting the insect with manure and phosphates, ammonia and potash, which treatment succeeds in porous soils; and to obtain this porosity he made use of dynamite, raising the soil from a great depth without injuring the vines. But the grape-growers seem not to believe in these medicinal insecticides, or considered them impractical, too costly, and their application too laborious. Many preferred to resort to planting American vines, mostly with a view to graft thereon their own varieties. And now the American vine has penetrated into all the vineyards of France—notwithstanding its many opponents, both honestly and otherwise; notwithstanding the ill-favor of the Government, where subventions had been reserved for the insecticides and the submersion. And this result is not a passing one, but has gained a stronghold by the exceptional and growing vigor of the American vines themselves, under various conditions of soil and in the midst of the most intense ravages of the Phylloxera. The Medoc even opens now its doors to the most meritorious grafting stocks, the *Riparia*, Solonis, York Madeira, being now convinced that their celebrated Medoc wines will not be in the least changed by grafting their varieties on American roots. It is the same in other famous wine districts, and even in the regions of the great white wines (Sauterne, Bommes, Barsac, &c.) which are as yet but little attacked by the Phylloxera. It has been the same in other countries, wherever the insect has made its appearance, in spite of all precautionary measures to protect them from infection.

Riley and Planchon have established the fact that the insect is indigenous to the North American continent east of the Rocky mountains, and there is little doubt but that it was first imported into Europe on American vines. Yet it must not be supposed that our American vines are all necessarily infested with Phylloxera, or that the insect has been introduced in every locality where our vines have been planted. On the contrary, there are localities where, from the isolated position of the vineyards, or the nature of the soil, it is difficult to find the insect, and, like many other indigenous species, it is in some years very numerous and injurious, in others, scarcely to be seen. There is comparatively little danger of its being imported from one country to another on clean *cuttings* of one year's growth, as the winter egg is almost invariably laid in the older, rougher portions of the vine. It should be recollected also that vines imported in late winter, or early spring, cannot possibly carry the insect, even if infected, in any other than the egg or larva form, as no winged insects are then in existence, to escape on the way, or upon opening the cases; and all danger of importing the insect would be avoided if the plants or cuttings, upon being unpacked, were placed in a bath of strong soapsuds.

Prof. V. MAYET, of the National Agricultural School at Montpellier, advises the following precaution: —(Vignes Am., Dec., 1882.) "1. Never to keep the cuttings in the soil, in whatever else we may preserve them for exportation; clear fine sand would be preferable. 2. To fumigate the cuttings on arrival with sulphur smoke, as the sulphuric acid infallibly kills all insects, without injuring the buds or vegetation; ten minutes are fully sufficient for that. An old large box may serve as a receptacle for the fumigation." In answer to inquiries whether this would be sufficient also to destroy the eggs of the Phylloxera, the Professor emphatically declares (La Vigne Americaine, May, 1883), that "we need not trouble ourselves about the eggs—none of these have ever been found on canes of one year's wood. And if ever any live insects were transported with cuttings, less than a quarter of an hour's fumigation with sulphur would kill them on arrival."

The greatness of the evil, however, seemed to justify the adoption of extreme measures, and the importation of both American vines *and cuttings* was strictly prohibited by the governments of Europe (except as to certain already invaded districts of France). Thus they excluded—not the insect, but the best remedy. And whilst it is now recognized and fully established that Phylloxera-destroyed vineyards can be reconstituted only by replanting with resisting American vines, be it for direct production or for grafting on them other preferred varieties, it is yet very difficult to get the prohibitions and restrictions repealed. V. Babo, the celebrated Director of the Oenol. Institute of Austria, Klosterneuburg, near Vienna, wrote us (April, 1883) that "notwithstanding the unanimous declaration of the Commission in favor of American Grape-vines, the Government refuses to listen; we shall tarry until the Louse will have spread as a great calamity. Sulphocarbonates are continually used—at Government's expense. The moment it shall have to be done at private expense nobody will use it, as the annual cost is out of proportion to the effect. In spite of my own most careful and through treatment with sulphocarbonates my success is incomplete. Much as I was at first in favor of sulpho-carbonates, I am now fully convinced that our grape-culture cannot be carried on except by using proper Phylloxera-resisting stocks."

The *Revue des Deux Mondes* of June 1, 1883, contains a very interesting article on the Phylloxera question by the Duchess of Fitz-James, in which she says:—"While the Phylloxera continues to extend her sinister veil over beautiful France, the American Vine throws over it here

* *La lutte contre le phylloxera.* (The struggle against the Phylloxera) by J. A. Barral, 1 vol., Paris, 1883, is the most complete work on this subject.

and there a ray of hope. Happy the soil which, in receiving it, lays hold of its good fortune. It is this ray before which the desert will vanish. Those who are unconscious of it, try in vain to defend a past which has escaped; for the chemical remedies, even if they were useful, are only exceptionally practical; and while thus many persevere in their ruin, pursuing a chimera, the American Vine covers with her verdant waves the last trace of our misfortunes." And the vintage of France in 1893, thanks to her now reconstituted vineyards, was equal in quantity and quality to her best years of the past.*

Fig. 87.

THE GRAPE LEAF-HOPPER.

(*Erythroneura vitis.*)

Very generally but erroneously called *Thrips*. This is one of the most troublesome insects the grape-grower has to deal with. It is a very active little thing, running sideways like a crab, and dodging around quickly to the other side when approached. It jumps with great vigor, and congregates in great crowds upon the under side of the leaf, pumping up the sap, and thus causing numerous brown dead spots, and often killing the leaf entirely. A vine badly infested with these leaf-hoppers wears a speckled, rusty and sickly appearance, while the leaves often drop prematurely and the fruit in consequence fails to ripen. There are several species which attack the vine—all belonging to the same genus, however, and only differing in color. The natural history of this insect is not recorded by entomologists, but Prof. Riley informs us that the eggs are thrust into the leaf-stems, and particularly along the larger veins of the under side of the leaves. Tobacco-water and soapsuds, to be syringed on the vines, are recommended in the books as a remedy. Prof. Riley recommends passing between the rows with a torch in the evening, smearing the stakes in the spring with soft soap or other sticky substance, and burning the leaves in the fall. The hoppers fly to the light of the torch; and as they pass the winter under leaves, loose bark of the stakes, etc., cleanliness in and about the vineyard is of the first importance in checking their ravages. The torch remedy is most effectual when three persons work in company, one between two rows with the torch, and one on the further side of each of the rows to give the trellis a slight shake and disturb the hoppers. Tobacco stalks or waste thrown on the ground in a grapery effectually protect the vines. He urges, however, that the insect be attacked early in the season, before it has acquired wings, and when congregating on the under side of the leaves. At this time a spraying with kerosene emulsion or with the *Bordeaux mixture* by means of a knapsack pump and the Vermorel modification of the Riley or cyclone nozzle will prove thoroughly efficacious, if only care be taken to spray the under side of the leaves. This treatment also destroys many other leaf-feeding or sucking insects, and at the same time is one of the best preventives of mildews and the various rots.

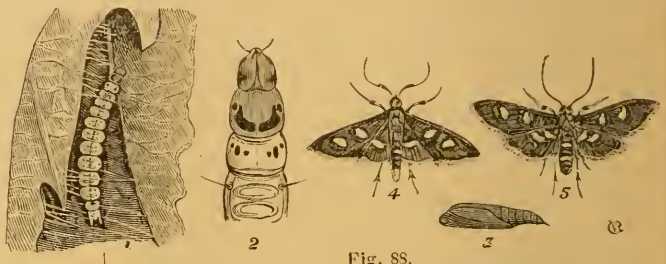


Fig. 88.

GRAPE LEAF-FOLDER: 1, larva; 2, head and thoracic joints, enlarged; 3, chrysalis; 4, 5, male and female moths.

THE GRAPE LEAF-FOLDER.

(*Desmia maculatis.*)

This is a worm of grass-green color, very active; wriggling, jumping and jerking either way at every touch. It folds rather than rolls the leaf, by fastening two portions together by it silken threads. The chrysalis is formed within the fold of the leaf. The moth is conspicuously marked with black and white, all the wings being bordered and spotted as in the annexed figures. The male is distinguished from the female by his elbowed antennæ, thickened near the middle, while those of the female are simple and thread-like. The moths appear in early spring, but the worms are not numerous till mid-summer. A good method to destroy the worm is by crushing them suddenly with both hands, within the leaf. The last brood hybernates in the chrysalis state within the fallen leaves, and much may be done towards checking the ravages of this worm, which during some years are very severe, by raking up and burning the dead leaves in the fall. The topical applications recommended for the Leaf-hopper are also effective.

THE GRAPE-VINE FIDIA.

(*Fidia viticida.*)

Fig. 89.

This beetle, often miscalled the Rose-bug, is one of the worst foes of the grape-vine in Missouri. It makes its appearance during the month of June, and by the end of July has generally disappeared. When numerous, it so riddles the leaves as to reduce them to mere shreds. Luckily this beetle drops to the ground upon the slightest disturbance, and thus enables us to keep it in check, by taking a large basin with a little water in it, and holding it under the insect. At the least jar the bugs will fall into the dish. When a quantity have thus been caught, throw them into the fire or pour hot water upon them. The late M. Poeschel, of Hermann, raised

* The wine product of France in 1893 was 1,098,000,000 gallons, the largest in any year since 1877. In 1879 it reached 1,056,000,000 gallons, but from that date to 1892 it ranged all the way from 506,000,000 to 792,000,000 gallons. In 1875, before the appearance of the insect pest, the crop reached 1,826,000,000 gallons. This gives some idea of the loss occasioned by the ravages of the phylloxera. The substitution of the more hardy American vines seem to have finally restored the vineyards.—*Boston Commercial Bulletin*, January 13, 1894.

a large brood of chickens, and had them so well trained that all he had to do was to start them in the vineyard, with a boy in front to shake the infested vines, and he himself behind the chicks. They picked up every beetle that fell to the ground; and next season he could scarcely find a single Fidia.

The Grape-vine Flea-beetle.

(*Haltica chalybea.*)

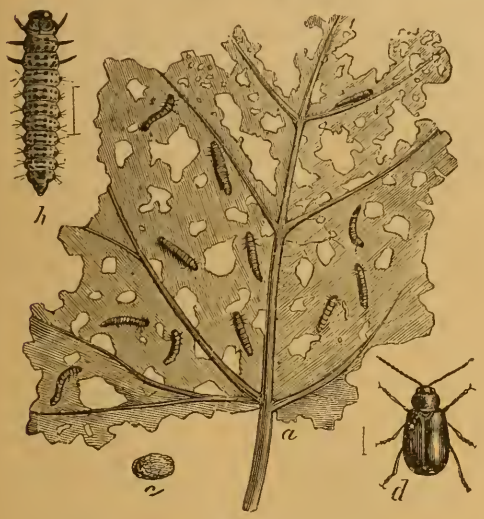


Fig. 90.

a, larva, natural size; *b*, do. magnified; *c*, cocoon; *d*, beetle, enlarged.

Like all Flea-beetles, this insect has very stout, swollen high thighs, by means of which it is enabled to jump about very energetically, and is consequently very difficult to capture. The color of the beetle varies from steel-blue to metallic green and purple. The beetles hibernate in a torpid state under any shelter, such as loose bark, crevices of stakes, etc., and they are roused to activity quite early in the spring, doing the greatest damage at this early season by boring into and scooping out the unopened buds. As the leaves expand, they feed on these, and soon pair and deposit their small orange eggs in clusters on the under side of the leaf. These eggs soon hatch into dark-colored larvæ, which may be found of all sizes during the latter part of May and early part of June, generally on the upper side of the leaf, which they riddle, devouring all but the largest ribs. Spraying with the Bordeaux mixture is the most satisfactory remedy.

The Gigantic Root-borer.

(*Prionus laticollis.*)

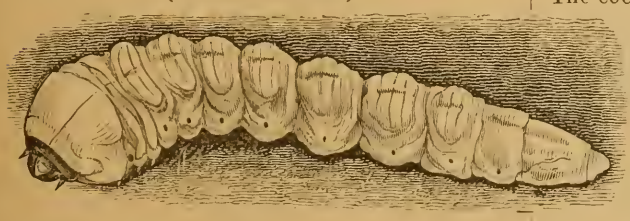


Fig. 91.

This large borer is often met with in and about the roots of several kinds of plants, such as the Apple, the Pear, and the Grape, to which it is very destructive. It follows the roots, entirely severing them in many instances so that the vines soon die. When fully grown it leaves the roots it was inhabiting, and forms a smooth, oval chamber in the earth, wherein it assumes the pupa form. If the roots are larger, it remains within them to undergo its changes. The perfect insect is a large, dark brown beetle, which first appears towards the end of June, and is very commonly found during the summer and fall months, rushing (often with a heavy, noisy flight) into lighted rooms. Prof. Riley has shown that this borer not only attacks living trees and vines, but that it also breeds in dead oak stumps, and can travel through the ground from one place to another; from which fact he draws the important corollary that it will not do to leave oak stumps to rot on ground which is intended for a vineyard—a fact which our experience corroborates. Little can be done in the way of extirpating these underground borers, their presence being only indicated by the the death of the vine. Whenever you find vines dying from any unknown cause, search for this borer, and upon finding one (in each case we have found but *one* at each tree or vine), put an end to its existence.

The Grape-berry Moth.

(*Lobesia botrana.*)

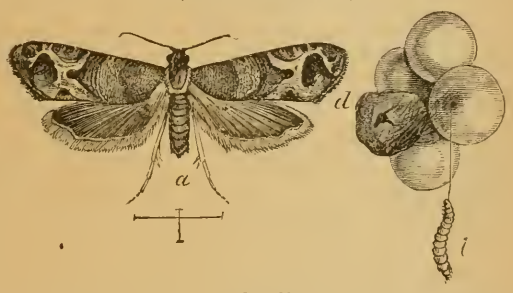


Fig. 92.

a, moth; *b*, worm; *c*, hole made in berry; *d*, rotting berry, caused by worm.

This insect first attracted attention about thirty years ago. About the first of July the grapes that are attacked by the worm begin to show a discolored spot at the point where the worm entered. Upon opening such a grape the inmate will be found at the end of a winding channel. It continues to feed on the pulp of the fruit, and upon reaching the seeds generally eats out their interior. As soon as the grape is touched the worm will wriggle out of it, and rapidly let itself to the ground by means of its ever-ready silken thread, unless care be taken to prevent it from so doing. The cocoon is often formed on the leaves of the vine, in a manner essentially characteristic: the worm cuts a clean oval flap, leaving it hinged on one side, and, rolling the flap over, fastens it to the leaf, and thus forms for itself a cosy little house, in which it changes to a chrysalis. In about ten days after this last change takes place, the chrysalis works itself out of the cocoon and the little moth represented in the figure (hair-lines showing natural size) makes its escape. As a remedy we recommend picking up all fallen berries and converting them into vinegar, as upon

racking off the juice and water, countless numbers of these worms are found in the sediment. This insect was named *Penthina vitivorana*, by Dr. Packard, in this country; but Prof. Riley informs us that it is an importation from Europe, where it is known as *Lobesia botrana*.

The Rose-chafer.

(*Macrodactylus subspinosus.*)

Fig. 93.

This is the true "Rose-bug," injurious to many plants, but especially hard on grape-vines during some years. In Prof. Riley's words: "It is one of those species whose larva develops under ground, and cannot be very well dealt with in this stage of its life. We must contend with it in the beetle form, and there is no other effectual means than by hand-picking, or by shaking into vessels and on to sheets. This work can be greatly facilitated by taking advantage of the insect's tastes and preferences. It shows a great predilection for the Clinton and its close allies, of all other varieties of the grape-vine, and will gather upon that variety and leave others unmolested, where it has a chance. Those who are troubled with this beetle will no doubt take the hint."

The Grape-curculio.

(*Cœliodes inæqualis*)

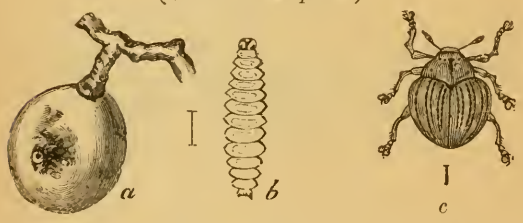


Fig. 94.—*a*, berry, infested; *b*, larva; *c*, beetle—the hair-line showing natural length.

The larva of this curculio infests the grapes in June and July, causing a little black hole in the skin, and a discoloration of the berry immediately around it, as seen in the above figure. From the middle to the last of July this larva leaves the berry and buries itself a few inches in the ground, and by the beginning of September the perfect insect issues from the ground and doubtless passes the winter in the beetle state, ready to puncture the grapes again the following May or June. This curculio is small and inconspicuous, being of a black color with a grayish tint. It is represented above, the hair-line underneath showing the natural size. This insect is very bad some years, at others scarcely noticed, being doubtless killed by parasites. It is thus that nature works: "Eat and be eaten, kill and be killed," is one of her universal laws; and we never can say with surety, because a particular insect is numerous one year, therefore it will be so the next.

All infested berries should from time to time, as they are noticed, be collected and destroyed, and the beetle may be jarred down on sheets, as with the Plum Curculio.

There are several Cut-worms which eat the young, tender shoots of the vine, and draw them into the ground below; they have destroyed, or kept back at least, many a young vine. The little rascals can be easily found and destroyed by digging for them under the loose clods of ground beneath the young vine.

There are many other insects injurious to the grape-vine—large solitary worms—insects which lay eggs in the canes—others which make curious galls, etc., but the reader who desires an acquaintance with these, must refer to Prof. Riley's reports.

It will be more useful to the grape-grower to close this chapter on insects with a brief account of some of

The Beneficial Species

which he will meet with, and which he should cherish as his friends.

Insects which are beneficial to man by feeding upon other insects that are injurious, may be divided into those which simply prey upon such injurious insects, without, however, being otherwise connected with them—the predacious insects; secondly, into those which in their earlier stages live in or on their prey—the true parasites. This last class is represented only by two Orders, viz., the Diptera, or two-winged flies, and the Hymenoptera (especially the families Ichneumonidæ and Chalcididæ). The egg is deposited by the mother parasite on or into the body of its victim, which is usually in the larva state, the parasitic larva feeding upon the fatty parts of its victim, and causing its death only after it has itself reached full growth.

Fig. 95.—Tachina-Fly.

The most important parasites among the Diptera are the Tachina-flies, which in general appearance are not unlike our common House-fly. Those among the Hymenoptera are by far more numerous in species and more varied as to general appearance and mode of development. We select for illustration one of the most common forms, viz., a Microgaster of the family Ichneumonidæ, a small inconspicuous insect which is known to prey upon a large number of worms and, among others, also on the Hog-caterpillar of the vine. By means of her ovipositor the female Microgaster inserts a number of eggs in the body of the caterpillar while this is still young. The Microgaster larvæ develop within the caterpillar, and when full grown they pierce the skin of the latter, and work themselves so far out that they are held on only by the last joint of the body. They then commence spinning small white cocoons standing on end, as represented in Fig. 97, the caterpillar having by this time died and greatly shrunk. A week or thereabout later the Ichneumon flies begin to hatch from the cocoons.

Fig. 96. Microgaster.

Fig. 97. Shrunken larva of Chœrocampa, with Microgaster cocoons.

The Predaceous Insects include numerous species of all Orders, and we can here only select a few of the more important ones which have been observed in connection with the insects injurious to the grape-vine.

Ladybirds.—The Coleopterous family Coccinellidæ, or Ladybirds, comprises in the United

States more than a hundred species, the larger of which may be readily distinguished by their round, convex form, the upper side being usually red or pink, handsomely variegated by black spots, which greatly vary in number and position; also a few species that are black with red spots, while the numerous smaller species are mostly of a more uniform dark color. With the exception of a few species which constitute the genus Epilachna, and a few allied genera, all Lady-birds are insectivorous, and, considering that many species occur in a large number of specimens and that the larvæ are very voracious, an idea may be formed of the great service performed by the Ladybirds in lessening the number of injurious insects. The Ladybird larvæ are especially fond of preying on the plant-lice, but they also feed extensively on the eggs and young larvæ of all insects. Whenever other food fails, they will even devour the helpless pupæ of their own kind.

Fig. 98.—Ladybird.

We select for illustration one of our commonest species of Labybirds, viz. the Convergent Ladybird (*Hippodamia convergens*), Fig. 98, *a* representing the larva, *b* the pupa, and *c* the beetle itself. The eggs of Ladybirds greatly resemble in appearance those of the Colorado potato-beetle: they are orange-yellow, and laid in small groups on the under side of leaves. The larvæ are very active and most of them very handsomely colored, those of the Convergent Ladybird being blue, orange and black. When full grown, they hang by the tail to the under side of a stalk or leaf and change to chrysalids. The perfect beetle is orange-red marked with black and white, as represented in the figure. It derives its name from the two convergent lines on the disc of the thorax. The larvæ of some of the smaller Ladybirds excrete a cottony matter, and one of them (belonging to the genus *Scymnus*) has been found to live underground, preying upon the root-inhabiting form of the Grape-phylloxera.

Thrips.—These are yellow or black insects, hardly visible to the unpracticed eye, but with the aid of a small magnifying glass at once recognizable by their narrow wings, beautifully fringed with long, delicate hair. The larvæ resemble in general form their parents, but differ not only in lacking wings, but in being of blood-red color. We refer to the Thrips and figure herewith given (Fig. 99), a black species with white wings

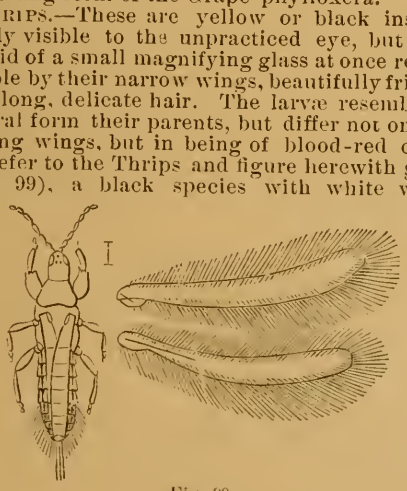


Fig. 99.

Thrips.

(*Thrips phylloxeræ*, Riley), because it is one of the most efficient enemies of the Grape-phylloxera, living within the leaf-galls caused by that pest, and doing more than any other species to keep the gall-inhabiting form of the Phylloxera within bounds. According to the recent classification the Thrips form a separate family, Thysanoptera, of the order *Pseudoneuroptera*.

Lace-wing Flies.—These play a very important rôle in the destruction of injurious insects, but here it is only the larva which does the beneficial work, the imago not being predaceous. These flies may be easily known by their delicate, greenish or yellowish wings, their brilliantly colored eyes, as well as by the peculiar, offensive odor emitted by them. The species represented herewith (Fig. 100) is the Weeping Lace-wing

Fig. 100.

Lace-wing Fly: *a*, eggs; *b*, larva; *c*, cocoon.

(*Chrysopa pluribunda*, Fitch), but there are many other species of this and allied genera which form the family Hemeroblidæ of the order Neuroptera. The eggs (Fig. 100, *a*) are adroitly deposited at the tip of long, silk-like stalks fastened to leaves and twigs. Sometimes these eggs are deposited singly, sometimes as shown in the figure, in little groups. The larvæ (Fig. 100, *b*) are very rapacious and move actively about in search of prey, which consists of soft-bodied insects and eggs of insects. When ready to transform, the larva winds itself up into a wonderfully small cocoon (considering the size of the insect which makes it and issues from it), as shown in Fig. 100, *c*. The imago issues through a neatly cut circular opening of this cocoon, also represented in the figure.

Syrphus-flies.—Associated with the Lace-wing larvæ we frequently find another class of larvæ or maggots of quite different appearance. They are blind and without legs, slowly moving about by means of stiff hairs with which they are covered, while others adhere to the leaves by means of a slimy secretion and move by alternately contracting and stretching out their bodies. In coloration these larvæ vary greatly, some being dirty-white or brown, while others are green or striped like caterpillars. Their prey is the same as that of the Lace-wing larvæ and

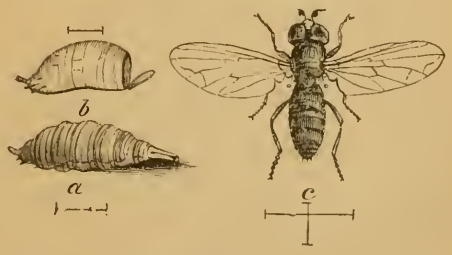


Fig. 101.

Root-louse Syrphus-fly: *a*, larva; *b*, pupa; *c*, fly.

their work is just as thorough. These are the larvæ of a large family of two-winged flies, called *Syrphidæ*, very numerous in species as well as in

individuals. When ready to transform, the larva becomes rigid, with the outer skin hardening and forming what is called a puparium, while the real pupa lies within this outer covering. In due time the fly issues from this puparium. The species figured in the accompanying cut (Fig. 101) is *Pipiza radicum*, Walsh and Riley), *a* representing the larva, *b* the puparium from which the imago has escaped, *c* the fly itself. This species lives, in the larva state, underground feeding both on the Apple-tree Root-louse and on the Grape-root-louse.

The Insidious Flower-bug.—This insect, of which we represent herewith a highly magnified figure, (Fig. 102), is quite commonly met with on all sorts of plants infested by injurious insects; and anyone who cares to observe this tiny, handsomely colored bug, or its larva, will have no trouble in convincing himself of its usefulness. It is really amusing to see how this small bug, and its still smaller larva, not only assiduously suck plant-lice and insect eggs of all sorts, but also pounce upon worms much larger than themselves and pierce them with their short, three-jointed beak. They roam about everywhere on the plants in search of prey, and are frequently found within the Phylloxera-galls playing havoc with the lice. The Insidious Flower-bug (*Anthocoris insidiosus*, Say) belongs to the order Heteroptera, or True Bugs, and may be known by its handsome coloration, being black, reddish-brown and white above. Its larva is orange-colored, and closely resembles in general appearance that of the notorious Chinch-bug.

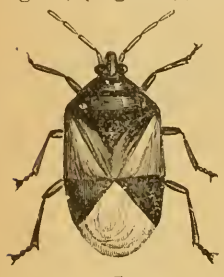


Fig. 102.
Insidious Flower-bug.

Besides the insects, you will still have other enemies to combat; foxes and birds, and, worst of all, some two-legged beings in human shape—thieves, who will steal your grapes if you do not watch and threaten to keep them off with powder and shot. We do.

GATHERING AND PRESERVING.

Whether it be for the table or for wine, do not pick the grape before it is fully ripe. Every grape will color before ripe; some do so several weeks before, but when thoroughly ripe the stem turns brown and shrivels somewhat. The finest qualities, the sweetness and aroma of the grape-juice are fully developed only in the perfectly matured grape; and we consider the *late* ripening varieties as far superior, especially for wine, to the *early* kinds, but, of course, only in such localities where *late* grapes will mature. This noble fruit does *not* ripen, like some other fruit, after being gathered. Always gather the grapes in fair weather, and wait till the dew has dried off before commencing in the morning. Cut off the clusters with a knife or grape-scissors, and clip out the unripe or diseased berries, if any, taking care, however, that the bloom be not rubbed off, nor any of the berries broken, if they are to be sent to market, or to be kept into winter. The bunches should be placed in shallow drawers or baskets, in which they are to be taken to the packing-shed, or some place under cover, and there assorted and packed.

For *packing* grapes for market, shallow baskets or boxes, holding from three to ten pounds, especially the so-called climax baskets, manufactured for the purpose in all the principal grape regions, are generally used. In packing in boxes, the *top* is first nailed on and a sheet of thin white paper put in; whole bunches of grapes are first put in; the vacant places left are filled with parts of bunches, of same kind and quality, so that all the space is occupied and the whole box packed as closely and full as possible, without jamming. Another sheet of paper is now laid on and the bottom nailed down. By this means, when the boxes are opened, only entire bunches are found at the top. The boxes are put in crates, or light large boxes, for shipment. Do not ship mixed inferior fruit—it will never pay; while uniform, good grapes will establish a reputation and command the best prices. Skill in handling and packing is only acquired by practice.

Grapes can easily be preserved for months by means of a cool room or cellar, where the temperature can be kept between 35° and 40° F. In a warm, damp atmosphere, grapes will soon rot. Fuller recommends, for preserving grapes, to bring them first into a cool room, spread them out and let them remain there for a few days until all surplus moisture has passed off; then pack them away in boxes, placing the bunches close together, and thick sheets of paper between each layer. When the boxes are filled, put them away in a cool place; examine them occasionally and take out the decayed berries, from time to time, as they appear. If the place is cool and the fruit *ripe* and sound, they will keep from three to four months.

Another method by which grapes are sometimes successfully preserved till late in March, especially in France, is this: Cut a branch having two bunches of fruit attached and place the lower end, through a perforated cork, in a small bottle of water; seal the upper cut end of the branch and also the cork with sealing-wax. A little charcoal in the water preserves its purity. The bottles are then placed in a dry, cool room where the temperature is pretty even and never falls below freezing point, and are kept in an erect position (usually by a rack made for the purpose), care being taken that the clusters do not touch each other, and that every imperfect grape be removed as soon as it shows signs of failing. Very few persons, however, can bestow this care, and still less have a fruit-room or cellar that can be kept so cool (40°).

Various other methods of preserving grapes fresh until late in the winter have been recommended, but experiments have generally not been as satisfactory as could be wished. Some varieties are found to keep better and longer than others, and in our Descriptive Catalogue the superior keeping qualities of our best kinds are always mentioned. In cold storage, specially constructed for preserving fruit, grapes will keep in good condition nearly all winter.

The best mode of preserving the delicious juice of the grape, with its delightfully nutritious constituents, in a concentrated and almost imperishable form, is by

WINE-MAKING.

The main purpose for which grapes are grown is for wine, the fermented juice of the grape, that universal, oldest remedy against human afflictions, that elixir which enhances our pleasures, dispels our sorrows and invigorates man as no other stimulant can. Even Noah and Bacchus already made wine of the grape, and its use as a beverage is almost as old as the grape itself. In Greece the time of grape gathering was the occasion of great festivities, consisting of public dinners, theatrical representations, music, sacrifices for the prosperity of the state and for the souls of the dead. True, a licentious Roman people converted those festivities into "Bacchanalia," but the wisest men of that time said: "Let us not ascribe these orgies to the God of Wine; let the excesses be punished and suppressed, but prize and use properly the Divine gift and it will embellish our life with flowers and fruits, it will foster poetry, fine arts and all social pleasures."

> "Judged by no o'erzealous rigor
> Much the gleam of wine expresses:
> Bacchus was the type of vigor,
> And Silenus of excesses."

In the bright glow of modern history, the glint of wine brightens many a state ceremony or religious rite. Kings, emperors, even bishops, fostered and promoted the culture of the grape. Carolus the Great sent vines from Orleans to be transplanted to the "Heights of Ingolsheim," and, according to popular legend, preserved in song, every year, when the grape-vines are in bloom, the great emperor arises from his grave to bless the vines along the river Rhine. Here, in our own country, William Penn, the founder of Pennsylvania, two hundred years ago, gave to that place (now a part of Philadelphia, then just settled by Germans from the Rhine and called Germantown) a town-seal with the inscription: "*Vinum*. Linum et Textrinum," to indicate approval of their leading industries: viticulture, flax-culture and weaving.

The uses of wine have existed and spread and grown all over the world, and nowhere has its manufacture been entirely suppressed except in China. Has it made the Chinese better, more virtuous or civilized? The use of enervating opiates has taken the place of invigorating wine. And this will be the consequence wherever wine is prohibited. In all civilized countries there is scarcely a festive board without wine. The church uses it in its sacred service as the symbol of God's noblest gifts; the physician prescribes it as a health-restoring tonic to the sick and convalescing.

Wine production has reached hundreds of millions of gallons, the wealth and pride of many nations, and its failure in one year is considered a great calamity where and whenever it occurs. A very small proportion of the grape production is utilized for the table compared to what is used for wine-making.

We grape-growers of America, east of the Rocky Mountains, can not produce as showy table grapes as California, nor do we claim that ours are the best wine-grapes the world produces. We may excuse the poetic effusion of a Longfellow, who sang;

> There grows no vine
> By the haunted Rhine,
> By Danube or Guadalquivir,
> Nor on island or cape
> That bears such a grape
> As grows by the beautiful river [the Ohio].

Or that:

> Catawba wine
> Has a taste more divine, etc.

We do not indorse such presumptuous assertions as you may find in some books and papers of American wine and grape growers, that "we can make wine which will rival and surpass the BEST wines of France, Germany and Spain." We may claim, however, that we are producing from our wine grapes some very fair, refreshing and wholesome, pure wines, and by the production of new superior varieties, by progressing in the art of wine-making, we may fully equal the average productions of the wine countries of Europe and make grape-growing one of the leading branches of horticulture.

We have been urged to embody in this manual a chapter upon this subject, and, notwithstanding the assurance that we think it impossible to furnish, within the limited scope of this catalogue, a complete guide to the inexperienced wine-maker, we have been called upon, again and again, for some concise information which might aid the intelligent farmer and the amateur grape-grower to transform their surplus fruit into that health-giving beverage, "wine." The books on wine-making to which they have been referred were either not accessible, or too costly, and contained so much that was unnecessary, to say the least, that we finally concluded to write this brief treatise, which, however, should be regarded as a collection of mere hints, being only intended to give the inexperienced a correct idea of the general principles of wine-making, and to contain some plain directions that may guard against false theories and wrong practice.

Those who intend to make wine, as a business, on a large scale, and who desire full information on all its branches, cannot expect to find it in this brief manual. Moreover, wine-making is an art which, however simple, cannot be acquired from books only, but must be learned PRACTICALLY; and we can only repeat our advice, given in the former editions of this catalogue, viz., to engage some experienced "wine-cooper" who knows how to make and treat wines, who has learned and has been accustomed to attend to wines from his youth, and who will watch over and nurse them with the care and cheerfulness of a mother to her infant, until you or your son may have practically learned from him. Such a man you may have to pay well, and you may think you cannot afford it; but to learn from sad experience, unless on a very small scale, would prove by far more costly and unprofitable.

Thus, without presuming to present anything new in this chapter, we hope that the grape-growers of this country may find therein as much information of practical value on so vast a subject as could be condensed in so limited a space.*

* There are but few books on wine-making written in the English language. Thudichum's "Treatise on Wine," London, 1894, is a mere reprint of a very old book. Haraszthy's "Grape Culture and Wine-making" was published (by Harper & Bros., New York, 1862) more than thirty years ago. Husman's "Grape Culture and Wine-making," San Francisco, 1886, treat only of Cali-

I. *Wine, its nature and substances, its formation and classification.*

Wine is the properly fermented juice of the grape; its unfermented juice is called *must*. The product of vinous fermentation of other saccharine juices of plants and fruits is often called wine, but none contain the life-giving, restorative qualities, the exquisite taste, the delicate bouquet, that harmonious combination of substances that we enjoy in the properly fermented juice of the grape. At all events we, as grape-growers, have to deal with the products of grape-juice only, and it is of this alone that we intend to speak.

However important it is to fully know the nature and chemical substances of wine and the law of fermentation, we must restrict ourselves to the absolutely necessary; it may also suffice, for most practical purposes, to know that the juice of the grape contains, chemically speaking:

1. *Sugar*, which afterwards, by fermentation, is transformed into alcohol. Most of the cellular substances in the unripe grape have transformed themselves, during the process of ripening, into sugar; the residue of these are thrown out during fermentation and sink to the bottom. The less ripe the grapes, the more of these substances and the less sugar will be contained in the must. If the vine drops its foliage before perfect maturity of its grapes (from frost, disease, or any cause) the sugar contents of its berries cannot increase; with complete maturity the sugar formation has attained its limit, diminishing thereafter.

2. *Acids*,—tartaric, tannic, and other acids, more or less, according to the degree of ripeness and the character of the grapes. A very small quantity of tannin is indispensable for the later treatment of the wine (for fining, etc.). A proper degree of tannin (2 to 3 per mille) is characteristic for red wine, and develops better the higher its temperature rises at fermentation and the more its husks are in contact with the fermenting fluid.

3. *Albumen*—a nitrogenous substance, plainly visible in the white scum of the must. Also, some resinous substances, gum, affecting the the body and taste of the wine; coloring matter, adhering to the skin, giving the color, especially to red wines; and so-called extractive matter.

All these substances, and many more, which have been chemically analyzed, are combined and dissolved in about three to four times their quantity of WATER in the juice of the grape.

As long as this juice is enclosed in the skin, which protects it from contact with the atmosphere, so long no fermentation can take place. As soon as the grapes are mashed, the influence of the air begins to act thereon.

Fermentation begins. It is produced by yeast fungi, which exist in the air like dust. They belong to the lowest form of plants; its spores or germs are so minute that microscopically magnified five hundred fold they appear as innumerable small, oval bubbles, containing protoplasma, a fluid resembling the white of eggs, wherein the germ cells are swimming. These are swelling, and out of each cell thousands of new cells will arise, within twenty-four hours, all floating in the air. Reaching the sweet fluid they develop more or less rapidly, according to the warmer or cooler temperature, producing the fermentation of the must; and when the yeast has reached its full development it begins to die out, transforming the sugar into alcohol and other substances.

However clear the unfermented juice may be, it becomes turbid by fermentation; the albumen commences to oxidize; the alcohol, while forming, separates the coloring matter from the skin; carbonic acid gas is formed in the mass, pushing up the firm parts and forming a dense cover over the liquid; the gas is developed in increasing quantities and escapes with a bubbling noise, and the heat of the fermenting mass is augmented. Gradually all these phenomena disappear, fermentation becomes less stormy, and the undissolved substances and new-formed matter fall to the bottom. The *new* wine is formed; by degrees it becomes almost clear, but fermentation still continues, slowly, almost imperceptibly; there are still substances of the must, finely distributed, floating in the young wine, and these substances, under an increased temperature, create anew a stronger fermentive motion, until the wine is clear and fully developed. On the proper guidance of this process the success of wine-making depends.

The more sugar grapes contain, the more alcohol will be developed in the wine under proper fermentation, and the more durable will it be, from the fact that the floating yeast more effectually settles. The durability of a wine depends largely on the quantity of the remaining undissolved substances in the same; it is therefore necessary to free it from those substances as soon as possible. The more regular, uninterrupted and complete the first fermentation, the more of the dregs or lees will have settled and the better the wine will become; particles of the sugar, however, remain floating undecomposed until after the second fermentation, usually during the time of the next blooming of the vines. Some of the acids, tannin, and albumen, are also generally precipitated and settle only during the second summer; and not till then can most wines be considered completely developed. Even after that period there is a further change perceptible in most wines; they become milder, and not only their taste but also their effects change. Old wines are considered less intoxicating and more beneficial; but there is a limit to this improvement by age, and very old wines become rougher, and less palatable, unless younger wine is added from time to time.

It is self-evident that the qualities of wine depend on the combination and proportion of the above mentioned substances in the must, and proper development during fermentation. From analysis of the best wines we find that a good wine should contain from 10 to 12 per cent. of alcohol, from 1 to 3 per cent. extractive substances, and ½ per cent. (5 to 6 pr. mille) acids, bouquet and aroma in proper proportions (which cannot be expressed or measured by any scale).

It is therefore important for the rational producer to examine the must from time to time, and this is practically made easy by a must-scale (saccharometer). There are different kinds; the

fornia, where he is now. Among the many scientific German works on this subject, the "Handbuch des Weinbaues und der Kellerwirthschaft, von Frhr. A. v. Babo, &c., Berlin, 1883," also "Weinbereitung u. Kellerwirthschaft, von Dr. H. v. d. Lippe, Weimar, 1884," are probably the best and most complete.

most generally in use being the Oechsle, showing the degrees of sugar-percentage (from 50° to 130°). Dividing the degrees shown on this scale by 5 we obtain approximately the percentage of sugar. For instance, 80° Oechsle shows $\frac{80}{5}$=16 per cent. sugar (more exactly, 16.3 per cent.); but as the instrument will not sink as deeply in cold as in warm must, a thermometer has to be used in connection or the must has to be brought to the indicated temperature. With the must-scales correction tables are furnished for the respective difference in temperature. The following short table may be useful:

TABLE FOR CONVERTING, BY L. WEIGERT.

Degrees on the Oechsle Must-Scale.	Equivalent Per-cent. Balling's Saccharometer.	Sugar Per-cent. of Babo's Must-Scale.	Vol. Per-cent. of Alcohol in future Wine.
47.7	11.8	10	6.3
52.3	12.9	11	7.0
57.5	14.1	12	7.6
62.6	15.3	13	8.3
67.8	16.5	14	9.0
73.1	17.7	15	9.7
78.0	18.8	16	10.3
83.3	20.0	17	11.2
88.7	21.2	18	11.8
94.1	22.4	19	12.5
99.2	23.5	20	13.2
104.7	24.7	21	13.9
108.4	25.9	22	14.6
115.9	27.1	23	15.4
121.1	28.2	24	16.1
126.8	29.4	25	16.9
132.2	30.5	26	17.6

The alcholic strength of wines can NOT be measured by any of the so-called wine-scales; these show the specific gravity, but never the alcoholic strength. A small distilling apparatus, *Alambic Salleron*, would be required for this purpose. (Instructions in its use accompany this instrument.) The wine-maker may, however, know in advance, from the sugar percentage of his must, how many per cent. of alcohol his wine will have, after complete fermentation, calculating 1 per cent. of alcohol for every 2 per cent. of sugar, measured by *Oechsle's* well-known must-scale. For a correct examination of the must, it should be clear (filtered, by pressing it through cloth first, then through filtering-paper), then pour the clear must slowly in the testing glass; increase or diminish its temperature to about 65° F. (14° R. or 17° C.) by dipping this glass in warm or cold water for a few minutes; dry the very breakable must-scale with care before and after using it. Tables showing the percentage of sugar for the various degrees of Oechsle's scale may be obtained with the instrument.

Next in importance it is to know the acidity of the must,—for which there exist also simple instruments whose use (with "Lackmus") is explained where such chemical apparatus are sold. Some wine-growers use now Twichell's acidometer, a safe and practical instrument for this purpose.

Grapes which have not ripened well—owing to unfavorable seasons,—contain less sugar and more acidity than necessary for the production of good wine. In such years the producer is forced to improve the *must* by aiding nature, increasing its sweetness and diminishing its acidity on scientific principles, never permitting any foreign, artificial or deleterious substances to be brought into the wine. Even the addition of pure chalk (carbonate of lime) above one per cent., which is much practiced in France, to reduce the acidity, is justly condemned and in some states prohibited by law.

Wines are generally classified (according to their saccharine substances) as follows:

(1) DRY WINES, in which all the grape sugar has been absorbed or transmuted by fermentation.

(2) SWEET WINES, which still contain a considerable quantity of sugar.

The former might be called the Wines of the North; the latter, the Wines of the South. The northern wines contain more acidity, and are consequently of a richer perfume, bouquet; the southern wines lack acidity; the spirituous element, sweetness, is predominating; they generally have no bouquet, and even the strong muscadine flavor of some southern grapes disappears in a few years.

With regard to color, wines are classified as WHITE and RED wines, though there are many shades between the two extremes, from the pale greenish-yellow of the Kelly Island Catawba to the deep dark red of our Norton's Virginia. The intermediate shades are generally not as well liked. Sometimes wines are also classified as STILL and SPARKLING wines, a merely artificial classification, as the sparkling is simply the result of a peculiar mode of manipulation (by fermenting in closed bottles, so as to retain and hold the carbonic acid gas)—a manipulation too complicated to be here described, or to be of any practical use to most wine-growers.

We shall now endeavor to proceed to the *modus operandi* of the grape-grower as a producer of still wines.

II.—*Gathering the Grapes—Mashing and Pressing.*

Some are impatient to gather their grapes for wine-making as soon as they color, others delay until they are over-ripe. Both are wrong. Not until the grapes have reached their full sweetness, the berries separate easily from the stem, the stems have lost their freshness and have become harder, dryer, brown or woody, are they ripe; but when they have reached that state of maturity gathering should not be delayed. It is impossible to describe or determine with exactness the point of full maturity; some varieties, especially those deficient in acidity, will reach it sooner than others, and in bad seasons grapes will not reach a perfect degree of maturity. In such seasons it would be even more useless than in favorable years to wait for an improvement by "after-ripening," as, aside from the danger of their entirely spoiling by late rains and frost, the loss in quantity would be far greater than the gain in quality. Grape-growers cannot afford to risk a large portion of their crop for a little better quality, especially as long as the latter is not sufficiently appreciated and paid for in this country. The dangers of loss are, of course, greater in the northern than in the more southern States, and in some localities the fall season is so constantly dry and warm that the above rule is thereby modified; moreover, some varieties improve more than others by getting slightly over-ripe, and are far better adapted for late gathering.

As such, we would especially name the Norton's Virginia.

To obtain a wine of superior quality it is necessary to SELECT the best and most perfectly ripened grapes, of varieties best adapted for wine, and to press them separate from those which are poor in quality or imperfectly ripe. But, instead of sorting the gathered grapes, it is generally considered more advisable—especially in seasons when the grapes do not ripen evenly—to sort them while gathering; that is to say, to pick first the best and ripest grapes, and let the others hang on the vines several days to ripen more fully; thus making two gatherings from the same vines. We here desire also to caution wine-growers not to plant too many varieties. A few kinds, suited to their locality, will pay best and make better wine. By this we do not wish to discourage the testing of different and new varieties, in small quantities, with a view to progress and improvement; but the planting of a great many varieties, each insufficient in itself, would necessitate the gathering of their grapes while some are not sufficiently ripened, others over-ripe, and these mixed together, cannot produce good wine. It almost seems unnecessary to say, that white-wine grapes and red-wine grapes should each be gathered and pressed separately. Grapes should be gathered with knives or scissors adapted to the purpose, and not torn from the vines merely by the hand. Some gather in baskets, others in hods, made for the purpose; but, whatever kind of vessels may be used, it is *important* that these, as well as *all* vessels used in wine-making, should be PERFECTLY CLEAN. Plenty of fresh water for washing them is, therefore, an essential requirement. Some first use hot water, to which some lime and salt have been added, in order to remove every trace of fungus which may have formed, and, after leaving such water in the vessels about 24 hours, rinse the same with plenty of pure cold water.

The grapes being gathered, we now come to—

THE MASHING OR CRUSHING, which is generally done in a press-house. For this purpose we use a WINE-MILL, consisting of two roughly notched rollers, so arranged as to be moved by a crank and cog-wheels in opposite directions, and having a hopper over them. Its construction is so simple that no explanation is required. The mashers should be so adjusted as to avoid the laceration of the stems and combs of the grapes, yet close enough to break each berry without crushing the kernels. Some wine-makers believe that the stems should be removed from the berries before mashing, which is done by the aid of sieves or rasps; others contend that the wines are not materially improved thereby, and that it is better *not* to remove the stems; owing, probably, to the tannin which these contain. But when the grapes have ripened poorly, and had to be gathered in that condition, it is necessary to remove the comb, which, being green, would still more increase the acidity and roughness.

Grape mills have taken the place of trampling with the feet—formerly in use. Well constructed mills, requiring but little strength, are so arranged that they can be set, according to size of berries, so as not to mash the stems nor the seeds and are not expensive. Recently a kind of centrifugal apparatus has been introduced for this purpose which is said to combine great advantages.

The press-house or press-room need not be in or near the vineyard, but should always be close to, and, best, immediately above the wine-cellar. It might be divided into two parts—one for mashing and pressing, the other for the fermenting-room. The press and mill should be placed in the center of the press-room, leaving space enough to go all around the press in turning the screw with the press-beam.

THE PRESSING, whereby the must is separated from the mashed grapes, called the marc or pommace, can be done with any kind of a cider-press; for large quantities, however, good screw-presses, specially made for wine are generally used; and the principal qualities of a good press are—to require but little force, and to afford abundant means of outflow to the juice. Strong, smaller presses are preferable to larger ones with weak pressure.

The mode and method of using the press, before and after fermentation, differs widely, according to the kinds of wine we intend to make. Before speaking of these, it is necessary to remark that the temperature of the room, while fermentation is going on, should be kept uniform without interruption: here in Southern Missouri at about 70° Fahrenheit (about 17° Réaum.);* in the South, where wine-making commences in August, it should be so arranged that it can be kept as cool as possible, and farther north so as to KEEP IT WARM—by the aid of fire, if necessary. A fireplace and kettle may also prove very useful in the press-house, avoiding, however, any heating stove which drives up all the hot air.

To the necessary furniture of the press-house fermenting-vats also belong, and may be ordered of any suitable size (not less than 100 gallons) from any experienced cooper; these are best made of poplar-wood; then good pine or cedar tubs and pails, not forgetting the must-scale, heretofore mentioned; and, finally, sufficient hose to run the fermented wine down the cellar. A good, common house-cellar, cool in summer and safe against frost in winter, will fully answer the purpose.

For those, however, who intend to make wine on a large scale, a separate WINE-CELLAR will, of course, become a necessity. A good wine-cellar should be dry; in damp cellars the casks become mouldy, the wine gets a bad taste and spoils. The cellar should be well drained, that it may be daily washed, for which purpose it must be amply supplied with water; it should have a sufficient number of air-holes to regulate ventilation and temperature. The temperature of a wine-cellar should not rise above 60° F. (12° R.) in summer, nor fall below 50° F. (8° R.) in winter. Such a cellar, with press-house and fermenting-room, store-room for casks, pumps and other tools, costs thousands of dollars, and the additional expense of having plans and specifications made by an able architect or builder, well-informed as to the requirements of a good wine-cellar, will be money well spent; it will protect you from great losses, which are the inevitable result of poorly and incorrectly constructed wine-cellars. But, however valuable a perfect, comfortable, well-arranged wine-cellar may be—let no wine-grower of small or even moderate means loose sight of its cost. Many œnological establishments, many a wine company, has been un-

* In Northern wine regions a lower temperature (about 60° F. = 12° R.) will favor a slower fermentation.

successful, has failed financially, because it has been burdened with too extensive and too expensive buildings. In places where deep cellars are impracticable or too costly, good wine-cellars can also be built above ground, on the system of the American ice houses, whose double frame walls are tightly stuffed with straw, sawdust, ashes, or other substances which are non-conductors of heat; the roof should be well projecting and heavily covered with straw.

As necessary *furniture* and *tools* of a producer's wine-cellar must be mentioned: Supports and layers of sound timber on which the casks rest, about 18 inches above the floor and at least 15 inches from the wall, so as to enable you to examine and to clean the casks at all times. The CASKS should vary in size from 160 to 500 gallons (the capacity to be distinctly marked on each). Very large establishments will, of course, also use larger casks. They should be made of good, well seasoned white oak wood. The larger sized casks should have so-called "man-holes," through which a man can slip in and clean them thoroughly; also, wooden funnels, pails and tubs, which can be obtained from any cooper; faucets, funnels; thieves for drawing out samples through the bunghole; rotary pumps with rubber hose to facilitate the drawing off from one cask into another; bunghole-borers, wooden hammers, and various kinds of other tools; sulphur-strips and hooks, candles and candlesticks, gauge sticks and measures, wine glasses for tasting; small step-ladders, and other utensils which are demanded in the course of operations, and may be seen in any properly furnished wine-cellar; and not to forget a good thermometer, which should always be at hand and frequently consulted.

New casks, however, are not ready and fit to receive wine; they must first be rinsed with boiling hot water—the casks must, however, be emptied again before the water gets cold—they are then filled with fresh water daily, during several days, then again a few gallons of hot water, in which common salt (two ounces to each gallon) has been dissolved, are to be poured into the empty cask, the bung firmly put in, and the cask rolled or turned until every part has been in contact with the hot salt water. After this operation (neglected by some) the cask is treated in like manner with two to four gallons of fermenting or boiling hot young wine. This is called making new casks *wine-green*. Another process much in use, is to put in the cask a hot lime-wash, made of unslaked lime and hot water, forming a kind of milk; the cask is turned about, so that its entire inside becomes coated with the mixture; after which the cask is washed with clean water and finally rinsed with hot wine, as before. If this last operation is not convenient, pour in a pint of pure alcohol, or brandy, and ignite it, leaving the bung slightly *open*. The fumes of the burning brandy will free the wood from its unpleasant taste, which would otherwise taint the wine. In large modern wine-houses steam is used to great advantage in this important operation. Small producers who have no steam at command, we would advise to get this done by the cooper who makes new wine casks or barrels. And then it would be safer to use such new barrels first for fermenting wine, thereby coating their inside with a crust of "argol" (crude tartar of wine). Old barrels or casks which had not been used for some time, must not be filled again, without first sulphuring them; without doing this no wine could be properly kept therein.

When a wine-cask is emptied and not at once refilled with other wine, it should be cleaned, and when dry, a small piece of sulphur (about 1 inch square) should be burnt in the cask, which is then to be closed tightly by the bung; when it is again to be used, it must be examined as to tightness, by pouring water into it, and, if leaking, is to be made tight by filling it with water and driving the hoops until it ceases to leak. It must also be examined as to the purity of its air, which can be tested by a small piece of burning sulphur strip. If extinguished when brought into the cask, this indicates the impurity of its air, from which it may be freed by the common small bellows, and by then washing it thoroughly, as above indicated. Old casks and barrels which are to be used for wine, must be watered and treated in like manner as new casks, to be made wine-green; but never use a mouldy or sour cask; better burn it up than to attempt its cure.

WHITE WINES.

The white wine grapes—and as a rule, *no black* or *blue* grapes should be used for white wine—are to be mashed, as soon as they are hauled to the press-house. This is best done in a grape-mill, placed above the fermenting vat. The vat is covered with a board or cloth, as soon as filled, and the mashed grapes are there allowed to ferment from 24 to 48 hours. The time, mashed white grapes should be permitted to stand, before pressing, depends on the temperature. As a rule, the mash of white wine grapes should be pressed before complete fermentation; while it begins to form a hat (from the skum) on its surface; being as yet sweet and making a comparatively mild, smooth wine. The juice which may then run off through the faucet inserted in the spigot hole near the lower end of the vat, is put into a well prepared, clean cask: then the entire balance of the mashed grapes is pressed, and the juice which comes off from the press is added to that obtained without pressing. By adding ten pounds of mashed grapes to about 90 pounds of must, its fermentation will be hastened and improved.

White wine can also be made from black or blue grapes, as the coloring matter is merely in the skin and is dissolved only during fermentation; consequently, by pressing the grapes at once, as soon as mashed (or even without first mashing), and before fermentation commences, thus separating part of the juice from the husks, a white or light-colored wine is obtained. The pressings, still containing a great deal of juice, are then thrown into the fermenting vat, some sugar-water is added to replace the portion of the juice heretofore withdrawn by a light pressing, and, after fermenting for several days, they are pressed again, and a red wine is produced from the same grapes. While we do not recommend this method, and consider both the white wine and red wine thus made as inferior to what could have been produced from the same grapes had their juice been allowed to ferment altogether on the husks, it certainly does not deserve that vituperation which has been heaped on our producers, who, in view of the failure of the Catawba and other white wine grapes, resorted to that method with the Concord. Hereafter it will scarcely be practiced by any, since there are a number of productive white wine grapes planted, and especially since grape-juice is cheaper than sugar.

The cask into which the juice has thus been put should not be completely filled, nor the bung hole closed, as long as violent fermentation lasts. During that time the (carbonic acid) gas which rises and fills that space, prevents any access of air, and the old method of closing the bung hole by a grape leaf, over which a small sand bag is placed, is still preferable to any complicated syphon. Care must be taken that the sand bags remain clean, for if soaked by the must or by wine, vinegar would form in them; some, therefore, use a cork stopper, holding a doubly bent glass or rubber pipe leading into a small glass jar, half-filled with water, through which the gas escapes without admitting the outer atmosphere. A funnel-shaped bowl with an air tube or chimney in the center, covered by an inverted cup or tumbler, which forces the escaping gas to pass through the water in the bowl, combines the same advantages and is less apt to break or get out of order. The construction of this useful fermenting tool (Fig. 103) is as follows: The funnel-shaped bowl (*c*) is pressed with its cylinder (*d*) into the bung hole, over it a cup (*b*) is placed and the bowl is filled with water (*e*). The forming carbonic acid gas must pass through the water (*e*)

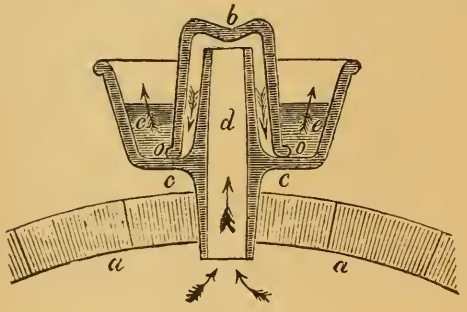


Fig. 103.

contained in the bowl, as indicated by the arrows, driving the air from the vacant space in the funnel (*d*) so that no acetic (vinegar) fungi can form. When the principal fermentation has ceased, or is no more perceptible, the cask should be filled up with similar young white wine, and then closed with a tight-fitting wooden bung. Mohr recommends a cork bung perforated by a glass tube filled with cotton, whereby the atmospheric air would be admitted without any germs of fungi. Babo recommends an ordinary wooden bung, perforated by a few small air holes, so arranged that an india-rubber ring will close it against the air, yet permit the escape of any carbonic gas by the elasticity of the ring. This simple fermenting bung is shown in Fig. 104. It is hollow inside from *a* to *b*, and is perforated from *c* to *d*, around which the india-rubber ring *e* to *f* is firmly fastened.

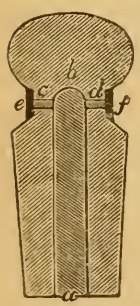


Fig. 104.

After the main or violent fermentation, the must will have become clear young wine, provided that fermentation has been uninterrupted and complete; having become clear, in December or January, it is drawn off from its sediment into clean, properly prepared wine casks. By this drawing off the young wine again becomes cloudy, only to become clearer in March or April following, when it is again drawn off before its second fermentation. As soon as it is apparent that, with the rise of temperature in May, this second fermentation approaches, the bungs must be opened, some wine drawn off from the full casks to make room for the inevitable expansion, and the sand bag or other apparatus is placed on the bung holes until the termination of this second fermentation, when the yeast and other impurities will have been precipitated and settled, and the finished wine must be drawn off again into clean, well-prepared casks. The proper and frequent *drawing off* is one of the most essential operations in wine-making. The object thereby aimed at is not merely to separate the *young wine* from its sediment, the dregs or lees, but to bring it in contact with the atmospheric air—while in *older wines* such contact must be carefully avoided. In drawing off the young wine we use a vulcanized rubber hose, one end of which is placed in the wine, so as not to touch the bottom of the cask, and from the other end the air is drawn, by the mouth, until the wine flows through it into wooden pails or tubs below. By a mere pressure of the two fingers the hose is closed and the flow stopped at will; the clear wine is filled into fresh casks by the aid of the wooden funnel, heretofore mentioned among the necessary tools. Rotary pumps, specially made for wine, are now generally used for drawing off older wines; but, as long as the wine is not quite and permanently clear, contact with the air during the drawing-off process is necessary. Permanent clearness, however, is often reached only after the wine has passed six or more times through this process.

This slow process of clearing or finishing the wines is accelerated by fining (in the case of white wines, with isinglass, gelatine; in the case of red wines, with eggs, etc.), by filtering, by aërating, by heating (Pasteurizing), and other artificial methods, which require special skill and apparatus, and which belong more to the manipulations of the wine-dealer's cellar than to those of the producer.

RED WINES

differ from white wines not merely in color, derived from the black or dark blue grape-skins, but these also contain other valuable ingredients, especially more tannin, which gives to red wines a peculiar character and important hygienic qualities.

The *red*-wine grapes need not be crushed as soon after picking as the white-wine grapes. Many authorities recommend that their stems be first removed, as these contain and impart more acidity than is desirable in red wines. The grapes are usually fermented from one to two weeks in upright, firmly closed fermenting vats, in which a perforated double or false bottom is placed, at about one-fourth the space from the top. This false bottom is to prevent the rising of the husks to the top of the liquid, as they would do in a fermenting tub without such double bottom, when they would have to be pushed down into the liquid several times each day, to prevent the formation of acetic acid in those husks, and to extract from them all the color and other valuable substances. The vat is, of course, first filled with the crushed grapes, then the double bottom is put in, so that it will be covered by about three inches of pure juice, which may be drawn off by the opening or faucet below, and poured in again after the double bottom is placed over the grape-mash.

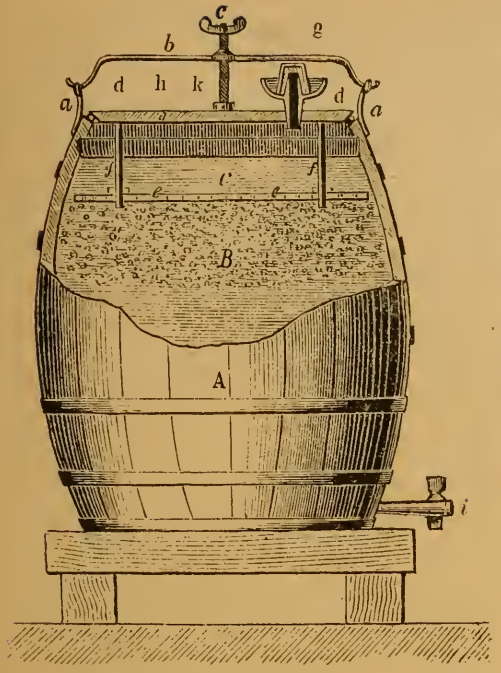


Fig. 105.

Fig. 105 shows such a fermenting vat, A, improved by the practical Oenolog, Antonio dal Piaz. The cover *d* closes it airtight (with a rubber ring) at the top of the vat, held with iron hooks *aa*, fastened to the bar *b*, and pressed down to the cover *d* by the screw *c*. The perforated wooden false bottom *e* is holding down the rising mash *e* by four supports *f* (two of which only are shown in the cut). By a wooden faucet, *i*, the must is to be drawn from the mash.

At first the mashed grapes are put in the open vat, filling it to within about 15 inches; then the perforated false bottom is laid upon them and the sticks *f* are placed erect thereon, supporting the cover *d*, which is to be finally pressed down by the screw *c*, and a fermenting funnel (Fig. 102) or bung is firmly placed on the top cover. If the mashed grapes were not covered by the liquid, so as to PROTECT them perfectly, after violent fermentation, from any contact with the atmosphere, vinegar formation might set in.

The fermenting bung or funnel is used the same as in white wines, to exclude the air and permit the escape of the carbonic acid gas. In various wine countries somewhat different methods are in use, but in all and every one of them success depends on a rapid, complete and uninterrupted fermentation, and this depends on the temperature of the fermenting room, which should be kept at about 75° F. (18-20° R.) by artificial heating if necessary.

The further treatment of red wines is entirely the same as that of white wines, and red wines are generally much sooner ripe and finished if *at first* well fermented; but if this has not been well done, its after fermentation and cure will be the more difficult; such red wines will receive a disagreeable sweetish-sour taste, and fining will sooner be harmful than beneficial.

BOTTLING

wines is by far more difficult and requires greater care than is generally supposed. While a completely fermented wine will keep unchanged for years if properly bottled, wines which are not fully ripe for bottling will become turbid if prematurely or improperly drawn into bottles, and it is by no means sufficient that it be apparently quite clear. Hence the small producer and consumer had better not draw more of his wine in bottles than may be sold or consumed before long. A bottle *half* filled with wine, seemingly ever so clear and sound, standing in a warm place, will gradually transform the wine into vinegar, just the same as if contained in a barrel or keg that is not kept full to its bunghole.

Every wine, not too rich in alcohol, if left for several days at a warm place, without keeping the the bottle, barrel or keg full to the cork or bung, will form on its surface a white skin, film or veil, similar to yeast cells (Mycoderma vini, Kahnen or Kuhnen, *German*), and if this white skin is not removed soon it will render the wine flat and, gradually, turn sour. Old wines are less exposed to the formation of that fungous disease. It may be removed by regularly and carefully filling up such wine through a funnel, reaching down below the white skin, so that the fungous veil, swimming on the surface, may overflow, running out through the open bunghole or bottle. To deaden any little remnant of the "Kuhnen" still remaining in the vessel, a very small quantity of pure, strong spirit may be used for the last filling. More difficult it is to cure the formation of vinegar-fungi (Mycoderma aceti); if not far advanced it is attempted by Pasteurizing (boiling) or by an addition of salicylic acid, marble dust, oyster shells, etc.; but if far advanced you cannot do better than to make good vinegar from it. For this purpose the diseased wine should be removed from the cellar to the warm kitchen or garret, or other warm place, and where it cannot contaminate your sound wines. But if the fermentation of your must has been properly conducted, the formation of a dry cover of the mash (hat) has been prevented and your wine kept in clean packages, always refilled, and in a cool cellar, you will hardly ever have any trouble with vinegar acidity.

All wine-books contain more or less voluminous instructions on various methods of improving the must which is to be made from sour grapes gathered during unfavorable seasons, and of curing wines which have suffered either from defective fermentation, or through errors or neglects in their treatment.

We do not pretend to condemn all these methods, as many others do; but while we consider it justifiable that the producer endeavor to improve his wine by the addition of pure sugar to the must, if it has been insufficiently developed in the grape, or to add a little pure spirits to the wine to make it more durable; and while we cannot see anything reprehensible in the fact that wine producers will try to extract from the pressed husk the large portion of wine-making properties which they still contain, to make a very good, wholesome and cheap domestic wine,—especially as the revenue laws make their distillation impracticable,—we do condemn the use of any and all foreign deleterious substances, and of all others, so-called, cellar mysteries. We would also warn the inexperienced against the use of any and all other attempts to improve or to add any-

thing to their wine, as these manipulations require scientific accuracy and practical skill, otherwise the result will surely be no improvement, aye, will most likely prove ruinous. The manufacture of sweet wines, cordials or liqueurs, and that of sparkling wines, is not within the scope of this brief manual.

A natural wine, the pure juice of the grape, properly fermented and educated, will always be superior to any artificially improved wine, and the only necessary conditions to obtain such superior natural wine are:

1. Good ripe grapes.
2. Clean vessels and utensils.
3. A proper, uninterrupted high temperature during fermentation.
4. Drawing off, as herein described, in December or January.
5. Drawing off again in March or April.
6. Drawing off after second fermentation.
7. Keeping the casks full, by refilling from time to time with good similar wine.

If these essential conditions are strictly complied with—and they are neither many nor very difficult—wine-making will be a success.

Some, however, say that American wines are very inferior, "scarcely fit to drink!" This was the preconceived opinion of foreigners, and of a great many Americans too; also, most American hotels and restaurants keep none but foreign wines—or else native wines under foreign names and labels;—and we are often asked whether we hoped ever to produce as good wines here as in Europe? Now, while we are far from presuming that "we can make wines which will rival and surpass the BEST wines of France, Germany, and Spain," we do claim that we are producing some very good wines, and shall before many years, by planting our best varieties and by progressing in the art of wine-making, fully equal the average production of the wine countries of Europe. This is no idle boast, no mere opinion of our own. The good qualities of American wines are now appreciated by the best and most impartial judges. Prof. St. Pierre, the late celebrated Director of the Agricultural School of Montpellier, says in his "Memoir" (*Extract from his Rapport*):

"The study of wines furnished by American varieties has engaged my whole attention since 1875. . . . The musts of the following varieties: *Jacquez*, *Rulander*, *Cynthiana*, *Black July*, *Elvira*, and many others, are found to be sweeter and richer than the musts of our best southern varieties. . . . The fine mountain wines of the south of France find their equivalents in the *Black July*, *Jacquez*, *Norton*, and *Cynthiana*; color, alcohol, savor, body, and keeping qualities, none are missing, and their products are equal to the good wines of the Provence or of Roussillon. . . . Trade will also find American wines for blending, similar to those of the *Narbonne*; the color and richness of the *Jacquez*, *Norton*, *Clinton*, etc., do not yield in the least to the deep-color wines of France."

"In the category of white wines, some American varieties offer equally valuable types. The wines of *Diana* and *Elvira* remind us of our good *Piquepouls*; the *Cunningham*, made as a white wine, presents characteristics approaching our *Grenache* wine. . . . It is thus evident that besides grafting, which enables us to obtain our French wines on American stocks, the direct cultivation of many American varieties can give us wines of true value. . . . I hope that the prejudice against these wines by persons who never tasted any others than *Concord* and *Isabella* wine, will finally fall before the evidence of experience."

May we not hope that the prejudice of our own American people will finally yield, and will rather trust to their own palates than to foreign labels and high prices?

But we are aware that there exists still another prejudice—one which condemns *all wines*, both native and foreign, from fear of their intoxicating effects. And we cannot close this chapter without a few words on

THE TEMPERANCE QUESTION.

Wine is itself an apostle of temperance. The best medical authorities, such as Dr. Lunier, Medical Inspector of the Insane Asylums and Prisons of France, and at the same time Secretary of the Temperance Society, has shown by able researches and reliable statistics that the ratio of percentages of disease and crime, attributable to alcoholic excesses, DECREASED in proportion as in each district the consumption of wine and beer increases; that the evils of intemperance are worse in the districts where wine and beer are scarce; that natural wine and beer cures the thirst for distilled spirits instead of exciting it. The French Temperance Society aims to repress entirely the circulation and sale of bad spirits—discovering modes of detecting them, punishing adulterations, and encouraging the use of pure, cheap wine, beer, tea and coffee, as the best means of curing the thirst for distilled alcohol. They think, probably, as we do:

> "To the sewers and sinks with all such drinks
> And after them tumble the mixer."

American travelers, returning from Southern Europe, who were strong opponents of wine before they visited those countries, now testify that where wine is most abundant, cheap and generally used by the people, drunkenness does not exist. The French Temperance Society receives the hearty support of all the leading physicians, scientists, legislators and of all intelligent men. Such a society in America, if properly organized, would receive similar support from all intelligent citizens of our country; but our temperance societies here, aiming after absolute prohibition, regardless of the principles of personal liberty, injure the very cause which they advocate with more zeal than wisdom.

We do not deny that wine is intoxicating if used to excess; but "good wine is a good familiar creature if it be well used."

> "From the wine cup's red and fiery fountain
> From the goblet's depth, enchanted gleaming,
> Deadly poison or a sweet refreshment,
> Beauty or vulgarity are streaming.
> 'Tis according to the drinker's pleasure,
> 'Tis his will that qualifies the measure.
> Thus the fool, by coarsest slumber fettered,
> Lies enchained—the slave of his desires;
> Yet the cup that robs him of his manhood,
> At our lips but strengthens and inspires;
> Kindles sparks of wit about us gleaming,
> Lends our speech an angel's inspiration,
> Through each vein a magic glow sends streaming,
> Lending beauty's sweet intoxication.
> For is wine not like unto the raindrop
> Which is filth itself when filth it reaches,
> But on fruitful ground it proves a blessing,
> And its hidden worth to mankind teaches."

DESCRIPTIVE CATALOGUE.

INTRODUCTORY AND EXPLANATORY.

The following Descriptive List of American Grapes includes all varieties which have ever received the attention of Viticulturists, of which we could obtain any reliable information. Thanks to the willing, kind assistance of our esteemed friends, veterans of grape culture,—especially to G. W. CAMPBELL, of Delaware, Ohio; P. J. BERCKMANNS, of Augusta, Georgia; T. T. LYON, of South Haven, Mich.; D. S. MARVIN, of Watertown, N. Y.; SAMUEL MILLER, of Bluffton, Mo.; Dr. J. STAYMAN, of Leavenworth, Kansas; HERMANN JAEGER, of Neosho, Mo.; T. V. MUNSON, of Denison, Texas; also to the distinguished Horticulturists and Directors of various Experiment Stations, S. A. BEACH, Geneva, N. Y.; HUGH N. STARNES, of Georgia, and MANY OTHERS,—we have been enabled to furnish descriptions which are probably the most complete that have ever appeared. Nevertheless, we are well aware of their deficiencies, compared with the exact ampelographic method of European Viticulturists.

The international formula for such descriptions demands—

1. The *name*, synonyms, origin, home of the variety, and where mostly cultivated.
2. *History*, literature of the variety, and its illustrations.
3. *Vine*, its general characteristics; vigor of growth; fertility, hardiness; resistance to frost, to parasitic diseases, to insects; requirements of climate, soil, culture, etc.
4. *Wood*, heavy or light, long or short jointed; color of wood; character of eye or bud.
5. *Shoots*, pushing early or late, smooth or hairy, color, etc.
6. *Leaves*—follage, its size, shape, sinuosity, (lobed), upper and lower surface (smooth, glossy, hairy, woolly).
7. *Petiole*—stem of the leaf, long or short, hairy or smooth, green or red.
8. *Leaf-fall*, early or late, change of color (to yellow or red, preceding fall), etc.
9. *Bunch*, size, shape, shouldered or not, compact or loose.
10. *Stem*, peduncles, tendrils, long or short, smooth or warty, intermittent or continuous, etc.
11. *Berries*, size, shape, skin, color, pulp or flesh, taste and use; for table or for wine, or both; keeping quality.
12. *Period of Ripening*, early medium, late,—and other characteristics.

AMPELOGRAPHY, the description of grape-vines, is comparatively a new science, and a complete description of American varieties according to this international formula is as yet impossible, and must be left to the future, to abler hands, to botanists. It would require large subventions, such as the Governments of Europe and her rich patrons of viticulture have bestowed on Ampelographic Works, illustrating them with large, fine, colored Plates, which are very costly. This is to be a DICTIONARY OF AMERICAN GRAPES (east of the Rocky Mountains), a hand-book for our grape-growers and those interested in the culture of these grapes; a record of the progress attained, but also of many failures and disappointments experienced. We have tried to furnish the best possible manual at a mere trifling cost, within reach of even the humblest grape-grower; we have endeavored to present each grape in its true character and nothing more. We have mostly rejected, or reduced, exaggerated illustrations for this catalogue. It is written with *no* desire to introduce or recommend varieties, "new or old," unless they possess merits, established by sufficient trial in the respective locality. We are by no means in favor of growing a great many varieties in any one vineyard; there are now already many grapes which might with advantage be discarded: but "there seems ever room for more;" and though further progress will doubtless continue through the agency of skillful and intelligent efforts, by growth of seedlings, by crossing and hybridizing, experimenters should conscientiously reject all which do not prove in some respects better than any others yet known.

Moreover, we consider all description by words inadequate, and even "figures" seem but insufficient aids. It is only by familiarizing one's self with the CHARACTERISTICS OF THE SPECIES to which a variety respectively belongs that descriptions become thoroughly intelligible; knowing the distinct characteristics which, by community of descent, all varieties of a certain class possess, their minute description according to the European formula becomes almost unnecessary.

We have, therefore, coupled with each variety the *species* to which it is (or seems) most closely allied, or from which it originated. First is given the STANDARD NAME in FULL-FACE type; then the SPECIES in *italics*, abbreviating them thus: (*Æst.*) for Æstivalis; (*Labr.*) for Labrusca; (*Rip.*) for Riparia; (*Lin.*) for Lincecumii, the Post-oak grape of Texas; (*Rup.*) for Rupestris; (*Rotun.*) for Rotundifolia; (*Vin.*) for Vinifera; (*Hybr.*) for Hybrids or Crosses (×), stating the species of both parents; in crosses between American varieties the one appearing to be the MOTHER plant

(*f.*) is named first: in all cases of admixture with Vinifera the American parent (whether *f.* or *m.*) is regarded as determining the classification (following the system suggested by Mr. STARNES); then the SYNONYMS are given in SMALL CAPITALS.

Varietes of pure American blood are all perfectly Phylloxera-resisting, hence it was deemed unnecessary to state this now well-established quality in descriptions of such varieties; in Hybrids, crosses with European (Vinifera) varieties, this resisting quality is more or less doubted.

The time of flowering is also best indicated by the species from which the grape originated (see Classification, p. 9). Dates cannot be given, as these differ; the time of fruit ripening is indicated for each variety, as near correct as possible, in comparison with the ripening of best known, most generally cultivated varieties (Concord, Delaware, etc.), but the period of ripening often varies in different seasons and localities.

The descriptions of LEADING VARIETIES and of the most prominent novelties which are specially worthy of attention, are printed in larger type (Long Primer); the description of varieties historically interesting, or considered valuable in particular localities only, or merely for amateur collections and new varieties intended for planting on a less extensive scale, are printed in medium type (Brevier). Descriptions of old, generally discarded varieties, also of new ones but little known and not disseminated nor tested, are printed in smaller type (Nonpareil).

The descriptions of the more important varieties contain also some notes on their roots and wood-growth, based on our observations only; under different conditions of soil, climate, etc., these may vary materially; as also the weight of must, which is intended to show the *sugar* in degrees on Oechle's scale, and the *acid*, in mills, in favorable seasons, in our own vineyards.

Of some varieties, not yet sufficiently tested, we have given the descriptions as received from their originators, omitting what may in future prove to be undue exaltations, as several years of observation are necessary to determine with accuracy the character and value of a variety: and even the praises of promising new varieties, by impartial authorities, which we quote in the description must be received with some allowance: remembering, however, that there are many varieties that do well and appear of great merit in some special localities, but are of little or no value in others.

In offering this Descriptive List, of over five hundred varieties, we are aware of its shortcomings as compared to what we conscientiously aimed at, yet hope that "after all it will be of some use to mankind;" and we request horticulturists to inform us of any errors or omissions, whose correction will be received as a favor.

In order to bring the Illustrations of Grapes on the same or adjoining pages with their descriptions, slight deviations from the exact alphabetical order were unavoidable. If any variety is not immediately found, please refer to the Index.

Adelaide. (*Labr.-Hybr.*) One of Jas. H. Rickett's hybrids between Concord and Muscat Hamburg. It is of medium size; *berry* of oval shape,* BLACK, with light blue bloom; of a sweet but sprightly flavor; purpled red flesh. (See Remark about Rickett's Hybrids, sub. R.)

Adeline. (*Labr.*) See Miner's Seedlings.

Adirondac. (*Labr.*) Originated at Port Henry, Essex County, New York, (first noticed 1852). Probably a seedling of the Isabella, being much like it in growth and foliage. *Bunch* large, compact, rarely shouldered; *berry* roundish-oval, large, oblong, BLACK, covered with a delicate bloom, transparent, with a tender pulp; thin skin; juicy and vinous; quality *best* "when you can get it."

Reports generally unsatisfactory. A slow, tender grower. Young vines have mildewed and older ones need protection. Blooms early; ripens about one week before Concord, but often has the fruit destroyed by late frosts. Roots very weak and tender. An amateur grape only.

Admirable. (*Linc.* × *Æst.*) See Munson's Hybr.

Advance. (*Rip.-Hybr.*) One of Rickett's† earl er seedlings, a cross between Clinton and Black Hamburg. "A superior grape, and at that time (1872) perhaps in advance of all others. The *berry* is BLACK, with a slight blue bloom, roundish-oval; *bunch* large, long and shouldered; flesh too good to describe except pomologically, and then I think it would read *'best.'*"—*F. R. Elliott, N. Y.*

Bunch large, *berry* medium, thin skin, scarcely any pulp; sweet and very sprightly—decidedly one of the best very early grapes. Vine healthy, vigorous and productive, but the fruit rots badly. Fully ripe here July 30.—*Sam. Miller, Bluffton, Mo.*

Foliage much inclined to mildew in unfavorable seasons, more so even than others of the hybrids. *Fruit* much inclined to rot; consequently not recommended.

* The shape of most berries of American grapes is globular, round; in varieties whose berries are of different shape, it will be expressly stated, as above.

† See *Rickett's* Seedling Grapes.

AGAWAM. (Rogers' No. 15.)

Agawam. (*Labr.-Hybr.*); Rogers' No. 15. Raised by E. S. Rogers of Salem, Mass., and considered by him as his best variety before the introduction of the Salem. It is a brownish-RED or MAROON grape of the Mammoth Sage and Black Hamburg cross. *Vine*, vigorous, a good grower and bearer; this is one of the few hybrid grapes that are capable of self-fertilization; *bunches* medium to large, often compact, shouldered; *berries* very large, somewhat globular; skin thick;

pulp soft; sweet, sprightly, of peculiarly aromatic flavor and a little of the native aroma; prefers long pruning; *roots* stout, fleshy and moderately fibrous, with a thick, smooth liber. Canes very stout, moderately long, with comparatively few, but strong laterals. Wood rather long-jointed, of average hardness and medium sized pith. Buds large and prominent. Ripens soon after the Concord, and keeps well without loosing its flavor. Reports generally satisfactory. In many localities it is inclined to mildew and rot, in others a decided success.

Aiken. (*Labr.*) See Isabella.

Albert. (*Labr.*) A seedling of Concord, grown by Theo. Huber, of Illinois City; a mere reproduction of the parent grape.

Albino. (*Labr.*) Syn.: GARBER'S ALBINO. Raised by J. B. Garber, Columbia, Pa. (supposed to be a seedling of Isabella). *Bunch* small; *berry* nearly round, slightly oval; YELLOWISH OR AMBER color. Flesh acid, tough; too late for the north.—*Chas. Downing.*

Aledo. (*Labr.?*) Introduced by B. F. Stinger, Charlottesville, Ind. (about 1887). Bunch medium, compact; berry medium to large, GREEN, lightly tinged with yellow; nearly round oblate; ripens about with Concord: quality not very good.

Alетha. (*Labr.*) A seedling of Catawba, originated at Ottawa, Ill.; said to ripen ten days in advance of Hartford. "*Bunches* medium size, stem long; *berries* hanging rather loosely; skin thick; color DARK PURPLE; juice nearly black, staining the hands and mouth. Flesh quite pulpy, with a decided foxy aroma; in foxiness and astringency it is much the same as a well-ripened Isabella." Not disseminated, which is not to be regretted, judging from the above description.

Alexander. (*Labr.*) Syns.: CAPE, BLACK CAPE, SCHUYLKILL MUSCADELL, CONSTANTIA, SPRINGMILL-CONSTANTIA, CLIFTON'S CONSTANTIA, TASKER'S GRAPE, VEVAY, WINNE, ROTHROCK of PRINCE, YORK LISBON. This grape was first discovered by Alexander, gardener to Gov. Penn, on the banks of the Schuylkill, near Philadelphia, before the war of the revolution. It is not unfrequently found, as a seedling from the wild Fox Grape on the borders of our woods. American grape culture proper began with the planting of this variety, at the beginning of our century, by a Swiss colony, at Vevay, in Switzerland County, Indiana, on the Ohio River, forty-five miles below Cincinnati. It was for some time supposed to be the famous grape of the Constantia colony, on the Cape of Good Hope.

Whether John James Dufour, the respected leader of that Swiss colony, shared that error, or whether he deemed it necessary to leave them in this error—while he had the sagacity to discover that their former failures (in Jessamine County, Ky., 1790-1801) were caused by planting *foreign* grape-vines, and intentionally substituted a native variety—we do not know; certain it is that this was the first successful attempt to establish vineyards in our country. A very good wine, resembling claret, was made from the *Cape*, and it was the favorite of former days until displaced by the Catawba. (The *White Cape* is similar to the above, differing only in its color, which is a greenish-white.) *Downing* describes it as follows: "*Bunches* rather compact, not shouldered; *berries* of medium size, oval; skin thick, quite black; flesh with a very firm pulp, but juicy; makes a very fair wine, but is too pulpy and coarse for table use, though quite sweet and musky when fully ripe, which is not till the last of October. Leaves much more *downy* than those of the Isabella."

W. R. Prince, in his Treatise on the Vine (N.Y., 1830), enumerates eighty-eight varieties of American grapes, but "for profit can only recommend the Catawba and the Cape; one-tenth of the latter variety would be enough. Of the two recommended above, the Catawba is much the more productive, but the *Cape is less subject to rot.* Both make good wines."

Alexander Winter. (——?) Introduced in 1892 by S. R. Alexander of Bellefontaine, O., who states that it was grown from mixed seed planted in 1884. His description says that the bunch and berry are of good size, AMBER color and very best quality; ripens in September and is hardy and productive. We have not seen the fruit yet. (N. Y. Experimental Station, S. A. Beach, Horticulturist.)

Alice. (*Labr.*) A chance Seedling found by Ward D. Green, of Cedar Hill, Ulster County, N. Y. in 1889. Vine very vigorous, but not a heavy bearer. It is a RED grape, medium size in bunch and berry; of good quality, juicy, sweet and fine but some fox flavor. Ripens unevenly; season about with Concord or a little earlier. (S. A. Beach, Hort. Experiment Station, Geneva, N.Y.

Alice. (*Labr.*) A seedling of Martha, originated by J. A. Putnam, Fredonia, N. Y. about same as Martha, its parent; not sufficiently distinct to be retained.

Alice Lee. (*Labr.-Hybr.*) A seedling of Lady Washington; raised by W. H. Lightfoot of Springfield, Ills. Vine vigorous in growth with long-jointed canes, large and heavy foliage, moderately productive; *cluster* above medium, compact; *berries* large, of bright GOLDEN YELLOW color; quality very good. A promising grape, ripens about with Concord.

Allen's Hybrid. (*Labr.×Vin.*) Raised by John Fisk Allen, Salem, Mass.: a cross between the *Golden Chasselas* and the *Isabella;* the FIRST OF AMERICAN HYBRID GRAPES, exhibited September 9, 1854, at the Massachusetts Horticultural Society meeting, where it was regarded with much interest, and on account of its fine quality and handsome appearance, was extensively tested with great expectation by enthusiastic planters, whose hopes, however, were never directly realized. Ripens early, about with the Concord. *Bunches* large and long, moderately compact; *berries* full medium; skin thin, semi-transparent; color nearly WHITE, tinged with amber; flesh tender and delicate, without pulp, juicy and delicious; has a mild, muscat flavor; quality best. The leaves have a peculiar appearance and partly foreign character. It is apt to mildew and rot, and cannot be recommended for general culture, though it is worthy a place in amateur collections. From a union of Allen's Hybrid with Concord, the *Lady Washington* was produced.

Alma. (*Rip.-Hybr.*) A seedling of the Bacchus, fertililized with a hybrid between a hardy native variety and the "Purple Constantia," from the Cape of Good Hope (?), produced by JAS. H. RICKETTS, who said, in presenting this seedling grape: "I feel confident that it will meet the approval of the grape and wine-growers of America, as it is a pleasant dessert grape, and makes a splendid wine, with a rose and wintergreen flavor delicately blended. This variety is a fine healthy grower; foliage large, lobed, slightly tomentose on the under side; perfectly hardy. The must has stood by the scale 100–107; acid, 5–7."

Ripens with or soon after the Hartford. *Bunch* medium, compact, seldom shouldered; *berry* medium, BLACK with blue bloom; spicy and very sweet. Vine vigorous and healthy. How this grape succeeds in other sections and soils we are not informed; at Rickett's place it does well and is very fine.

Alphonse. (*Labr.*) Produced by Theophile Huber of Illinois City, Ills. The largest of his *white* seedlings. Vine, very strong grower and bearer; *bunch* large, shouldered; *berries* as large as Worden, but oval, YELLOWISH in color; pulp tender and juicy with a resemblance to Elvira in flavor; not of as good quality as his other white seedlings.

Alvey. (*Æst.-Hybr.*) Syn.: HAGAR. Introduced by Dr. Harvey, of Hagerstown, Md. Generally classed with *Æstivalis*, but its erect growth, soft and short-jointed wood, rooting very easily from cuttings, the exquisite quality, pure vinous flavor—all point to the *Vinifera*, and force us to the conclusion that *Alvey* originated from an intermixture of Vinifera and Æstivalis, crossed by natural hybridization. *Bunches* medium, loose, shouldered; *berries* small, round, BLACK; sweet, juicy and vinous, without pulp; a slow grower, making a stout, short-jointed wood; moderately productive; *roots* medium thick, more inclined to the wiry character of the Æstivalis class, with a medium smooth liber. Canes remarkably straight and upright, gradually tapering, and not inclined to ramble like most American varieties. Tendrils short and thin, often three-forked; buds covered with slight hairy down; the dark, medium-sized foliage has also a slightly downy, whitish lower face; the tender young leaflets are very thin and almost transparent. Laterals few and feeble; wood rather soft, with large pith and coarse bark. These characteristics, together with its thin skin and total absence of pulp, strongly indicate a foreign character. Excellent in quality, but apt to drop its leaves on southern slopes; it makes a fine red wine, but too little of it, as it sets its fruit badly; seems to prefer the deep rich, *sandy* loam of our northeastern or even northern slopes. Reports generally unfavorable.

Amalia. (*Labr.* ×). A cross between Rommel's Faith *f* and Ives' *m*, originated at Lincoln, Ills., by F. E. L. Rautenberg. Vine very hardy and healthy, wood hard and short-jointed, with healthy, leathery foliage. Bunch above medium, berries medium, round; a BLACK grape of very good quality, almost like Rogers' Aminia (No. 39).

Amanda. (*Labr.*) Description in our former edition, copied from Catalogue of Bluffton Wine Co. (and Hort. Annual, 1868) totally differs from the fruit which we obtained from plants of same source, "It is a *large* BLACK, thick-skinned, hard-pulped grape; in taste and aroma somewhat similar to Ives and Rentz; the *bunch* is of medium size, compact, quite showy; the vine a most vigorous, healthy Labrusca. Esteemed for red wine by some;—may be the same as "August Pioneer."

AMBER, (Rommel's.)

Amber. (*Rip.* × *Labr.*) A sister of the Elvira, raised by Jacob Rommel of Missouri. Vine hardy, but only moderately productive; Rommel says it should be fruited on spurs from old wood; a rather long-jointed strong grower; dark brown wood, with large foliage, somewhat downy beneath. *Bunches* long, shouldered, moderately compact; *berry* medium, oblong, pale AMBER when ripe, skin thin; pulp tender; sweet, juicy and of fine flavor. Ripens later than Concord, and somewhat earlier than Catawba. A table grape, combining good quality with attractive appearance, but too tender for shipping to distant markets. It seems not to hold its leaves as firmly as other Taylor seedlings.

Amber Queen. (*Labr.-Hybr.*) Some suppose it to be a seedling of Marion, crossed with Black Hamburg, introduced by N. B. White of Norwood, Mass. It has, however, continuous tendrils, indicating Labrusca admixture. Described in Ellwanger & Barry's catalogue (by the originator) as follows: Bunch large, shouldered like the Hamburg; berry large, frequently oblong; holds persistently to the bunch; AMBER colored at first, but grows darker till it becomes a deep purple grape, almost black, flesh tender, rich, and seeds small; plant a strong grower, with thick leaves, somewhat downy on the under side. Fruit eatable in August, and with proper care will keep all winter. Some clusters do not fill well, showing that it is not fully self-fertilizing; it is also very prone to mildew.

Ambrosia. (*Labr.-Hybr.*) A seedling of Salem, originated by Alfred Rose, Penn Yan, N. Y. Vine vigorous, a good bearer; bunch large, compact, handsome, slightly shouldered; berry WHITE, with delicate bloom, medium; nearly round, but slightly flattened; it drops from the cluster easily; skin of medium thickness. Pulp not melting, but separates easily from the seeds, juicy, pleasant flavor, of very good quality. An amateur grape only. (New York Experiment Station, S. A. Beach, Horticulturist).

America. (*Linc.* × *Rup.*) See *Munson's* Hybr.

Aminia. (*Labr.-Hybr.*); Rogers' No. 39. In fall of 1867 we tried to get those of Rogers' unnamed hybrids, which we had not yet tested, and, aware of the confusion existing as to their numbers, we obtained a few of each number from different sources. Of those which we planted as No. 39 three survived, but not two of them were alike. One of them proved especially valuable. To ascertain whether this was the true No. 39 we addressed Mr. Rogers, to let us have a plant or a graft of the original No. 39, but were informed that the original stock was lost!

One of our vines, No. 39, proved so valuable, that we determined to propagate it, and planted fifty vines thereof, while we destroyed the other two. From the commendation given to No. 39 at the quarter-centennial session of the Am. Pomol. Society, by its president, the late M. P. Wilder, we gave ours the name Aminia. Mr. Rogers assented thereto, and it is considered, by good judges, the best of Rogers' hybrids. *Bunches* medium, slightly shouldered, moderately compact, more even and better on an average than Rogers' grapes generally make; *berries* full, medium to large, dark PURPLE, nearly black, with a fine bloom. Flesh melting, with but little pulp, sweet and of fine flavor, ripening very early, about with the Hartford. We consider it one of our *earliest good* grapes. Vine moderately vigorous, quite hardy, productive; (should be planted near some other variety that blossoms at the same time, to fertilize it); but fruit inclined to rot. Deserves to be extensively cultivated as a table grape.

Amoureux. (*Æst.*) See Rulander.

Amy. (*Labr.*) A greenish-yellow or WHITE seedling of the Concord, raised by W. H. Lightfoot, of Springfield, Ill. *Vine* healthy and hardy like its parent, and ripening with it; bunch and berries not as large as his "Capital" (q. v.), another white Concord seedling; it is YELLOW when ripe.

Anna. (*Labr.*) Seedling of Catawba, raised by Eli Hasbrouck, Newburgh, N. Y., in 1852. G. W. Campbell of Delaware, Ohio, described it as hardy and healthy and of a moderate growth. *Bunches* rather loose, of medium size; *berries* medium; color, light AMBER, with small dark specks, covered with thin, white bloom; rather pulpy. Ripens with the Catawba; unhealthy and feeble.

Annie M. (*Labr.*) A chance seedling, raised by Dr. L. C. Chisholm, near Nashville, Tenn. The vine is a thrifty grower, with long-jointed canes, needs plenty of fruit-wood, yet a rather shy bearer. It is a handsome grape; in berry and bunch of medium size, not shouldered, but smooth and compact. Color, WHITISH GREEN, quite sweet; ripens about with Concord, and so far, not at all inclined to rot.

Antoinette. (*Labr.*) One of Miner's seedlings. A handsome, large WHITE grape of the Concord character, with long, moderately compact bunches; a strong growing, healthy vine, and very productive; ripens earlier than Concord; flavor sweet, rich, with little pulp; few seeds, and but little of the foxy aroma. See also *Concord* WHITE seedlings, (p. 107).

Ariadne. (*Rip.* × *Vin.*) One of Ricketts' Clinton seedlings; *vine* vigorous and healthy; productive, much inclined to overbear; *bunch* compact, resembling Clinton, but much better in quality; very juicy, sweet; producing a light red, heavy wine of fine flavor. These notes, taken at J. H. Ricketts' Experimental Grounds several years ago, are somewhat modified by his List of March, 1882, wherein he describes it as a Seedling of Clinton and a Newburgh Vinifera; the wood short-jointed and only moderately vigorous; *foliage* medium, coarsely serrated; *bunch* small to medium, compact; *berry* small, round, BLACK, with a light blue bloom; flesh soft, tender, juicy. It makes a very dark and rich wine of good body, with Sherry flavor. Mr. Ricketts was confident that this grape would become popular for wine purposes. It never did.

Arkansas. (*Æst.*) See Cynthiana. (Syn.)

Arkansaw. (*Labr.*) Introduced by Jas. Hart, of Fayetteville, Ark. In Mitzky's "Our Native Grape," Rochester 1893, it is described: Vine strong grower, *short* jointed, lively green leaf which remains in perfection long after the crop is gone; hardy as Concord; very productive and healthy; bunch large compact; berries larger than Concord; while turning pinkish when fully ripe, transparent; skin thin, tough, clear with a delicate bloom; pulp melting and juicy; flavor very high, similar to Southern (?) Muscadine and very fragrant; ripens a week ahead of Concord.

We have not seen or heard anything of this remarkable grape except that it was received by the New York Experiment Station in 1893 for testing.

Arnold's Hybrids.* See Othello, (No. 1). Cornucopia, (No. 2). Autuchon, (No. 5). Brant, (No. 8). Canada, (No. 16).

Arrot (or Arcott?) (*Labr.*) Philadelphia; *bunch* and *berries* medium, WHITE; resembling the *Cassady*, but not as good. "Sweet and good, with a thick skin; good grower and productive," said Husmann.

Aughwick. (*Rip.*) Introduced by Wm. A. Fraker, Shirleysburg, Pa. *Bunches* shouldered, similar to Clinton; *berries* larger than Clinton, BLACK, juice very dark, of spicy flavor; said to make a very dark red wine, of superior quality, and to be entirely free from rot or mildew; very hardy and healthy. We found it *not* as good as Clinton, and less productive. Should be discarded.

Augusta. (*Labr.*) See Miner's Seedling.

August Giant. (*Rip.-Hybr.*) A cross between Black Hamburg and Marion. Originated by N. B. White of Norwood, Mass. Leaf strong and thick, and vine a very strong grower and bearer; *bunches* very large with rather long and very strong stem; when shouldered the shoulders are very short and double; *berries* BLACK, very large, somewhat oblong, often measuring 1⅛ inch in diameter. Placed in a basket beside Black Hamburg the August Giant can hardly be distinguished from it. Fruit when well grown has a decided Hamburg flavor; quite tender to the center, very rich and fine; fruit ripe in August. A fine amateur grape.

August Pioneer. (*Labr.*) Origin unknown; one of the coarsest of native sorts; large, BLACK, with a firm, hard, pulpy flesh; fit only for stewing, Middle of August.—*Downing.*

* The late Charles Arnold of Paris, Ont. Canada, has been successful in his experiments in hybridizing the native Clinton with the pollen of foreign varieties. His seedlings seem to be of decided promise in some localities.

"Bacchus"
Eng. by A. Blanc
Phila.

AUTUCHON.

Autuchon. (*Rip.-Hybr.*); Arnold's No. 5. A seedling of Clinton, crossed with Golden Chasselas. Leaves dark green, very deep lobed and sharp pointed serratures; the unripe wood is very dark purple, nearly black. *Bunches* very long, not heavily shouldered, rather loose; *berries* medium size, round, WHITE (green), with a moderately firm, but readily melting flesh, and an agreeable, sprightly flavor, resembling the White Chasselas. Skin thin, without astringency. Ripens with the Delaware.

The Autuchon did not come up to expectations; it proved tender and unreliable, in the West at least; its fruit subject to rot and mildew, and notwithstanding its fine qualities, it will remain but an amateur variety and cannot be recommended for profitable culture in vineyards.

We append an illustration which gives a truthful view of the bunch as grown with us, for we have never seen any so large as represented by the cut used in our first edition, and which was obtained from the originator.

Bacchus. (*Rip.*) A seedling of the Clinton, produced by James H. Ricketts of Newburgh, N. Y. Resembles the parent in leaf, bunch and berry, but considered by some as superior to it in quality and productiveness. *Bunch* medium, compact, shouldered; *berry* round, below medium, BLACK with blue bloom, juicy and sprightly. Ricketts said: "With me it has stood all possible tests for over fourteen years, as to hardiness of wood, leaf and fruit. Wherever tested, all agree in ascribing to it the peculiar qualities necessary in a perfect wine grape." The Bacchus makes a dark brownish-red wine of great body. Must registered 95° to 110°. Some regard the Bacchus, as a wine-grape, with greater favor than any of Ricketts' many other seedlings; superior to Clinton, also for a late table variety; it can be left on the vine very late if bagged, improving in quality; it grows well and is free from mildew, but too late and uncertain for extreme northern localities.

The annexed cut of the Bacchus on page 87 shows this grape, reduced about one-fourth of its natural size.

Bailey. (*Linc.*$\times$*Trin.*) See Munson's Hybrids.

Baker. (*Labr.*) See Isabella.

Baldwin Lenoir. (*Æst.*) Originated at West Chester, Pa.; said to be a seedling of the Lenoir; *bunch* small, rather loose; *berries* small, quite dark, almost BLACK; flesh somewhat rough, acid, brisk. Reported the richest in grape-sugar of twenty-six varieties tested by the chemist of the Agricultural Department at Washington. In foliage and habit of growth, it is much like Lincoln. Bunch and berry similar to Norton's; valuable for red wine.

Balsiger's. (*Æst.* $\times$) A cross between Norton's and Martha, produced by J. Balsiger, of Highland, Ill. It is planted in several vineyards of Virginia and in Northern Texas, more as of botanical interest; though of agreeable taste, ripens very late.

Balsiger's No. 2 and No. 32. (*Labr.*) See Concord Seedlings.

Barnes'. (*Labr.*) Originated with Parker Barnes, Boston, Mass. *Bunches* shouldered; *berries* medium, oval, BLACK, sweet and good; nearly as early as Hartford.—*Strong.*

Barry. (*Labr.-Hybr.*) (ROGERS' No. 43.) One of the most attractive of Rogers' Hybrids, "as handsome as the *Black Hamburg*," from which it is a seedling crossed on Mammoth Sage. Vine as vigorous, healthy and hardy as any one of Rogers' Hybrids. *Bunch* large, always rather broad, short and compact; sometimes larger than represented on the annexed engraving; *berry* large, roundish; color BLACK; flesh tender, of a sweet, pleasant flavor; skin thin, somewhat astringent. Successful in Western New York and some other localities where it is justly esteemed as an excellent, showy grape. Very productive and early, but little earlier than the Concord, and keeps remarkably well. In some northern localities it has the defect of dropping its leaves before the fruit matures.

Baxter. (*Æst.*) *Bunch* large and long; *berry* below medium, BLACK; very late in ripening, hardy and productive; not fit for table, but may be valuable for wine.—*Bluffton Wine Co.'s Catalogue.*

Bay-State. (*Rip.-Hybr.*) A seedling of the Black Hamburg crossed by Marion; introduced by Wagener & Co., Pulteney, N. Y. Vine vigorous and hardy; foliage large; *bunch* medium

BARRY. (Rogers' No. 43.)

to large, well shouldered; *berry* red, slightly oblong; pulp tender, juicy, sweet and sprightly; ripens early, but is a good keeper and adheres well to the stem. A nice RED amateur grape for table use.

Beacon. (*Linc.*×*Conc.*) See Munson's Hybrids.

Beaconsfield. (*Labr.*) See Champion.

Beauty. (*Est.-Hybr.*) One of Jacob Rommel's seedlings; a cross between Delaware and Maxatawney; a vigorous, healthy grower; foliage heavy and healthy, yet subject to sunscald; resembling Catawba (and we suppose it to be a cross between *Catawba* and Maxatawney with Delaware); *bunch* small to medium, well filled, but not too compact; *berry* in size and color between Catawba and Delaware, oblong, covered with lilac bloom; thick skinned, and will carry well; ripens between Delaware and Catawba, and is of very fine quality, having tender pulp; sweet, with delicate flavor. A good table grape, making also an excellent wine. In fact, a sample of "Beauty" wine, at the Bordeaux Exposition, in September, 1880, was pronounced by the French Commissioners "*the best* American white wine on exhibition; having a very marked and agreeable bouquet."—*M. Lespiault.*—In the third edition of this catalogue we said: "Its parentage justifies the fear that it may be subject to mildew in localities not exempt from this disease;" and so it proved, it was also inclined to rot in wet season; so much so that honest Rommel stopped its propagation and dissemination; but now, under the protection of spraying with fungicides it is well worth resuming its cultivation.

Beauty of Minnesota. (*Labr.* × *Del.*) Originated (or introduced only) by J. C. Kramer, of La Crescent, Minn. Described by him as a seedling of Delaware crossed with Concord; a good grower and healthy; *bunch* equal to Concord, but more compact; *berry* GREENISH-YELLOW when ripe and of rich flavor; recommended by him and indorsed by many testimonials as the best grape for the climate of Minnesota, ripening there by the 1st of September. Pulpy, poor quality, in Ontario, Canada.

Belinda. (*Labr*). See Miner's seedlings.

Belvidere. (*Labr.*) Originated by Dr. Lake, of Belvidere, Ill. Was expected to be a valuable market variety, on account of extreme earliness; large size and fine appearance. In some localities was claimed to be an improvement in bunch and berry upon Hartford, but in quality is not much, if any better; like Hartford, it shows a tendency to fall from the bunch, especially if a little over-ripe. Being in appearance much like Hartford, a description is unnecessary. It is a vine of very vigorous growth, perfectly hardy and healthy, very early and productive; but so is the Hartford also, and, we think, we have more than enough in *one* variety of such poor quality.

Benjamin. (*Labr.*) Raised by W. H. Lightfoot, of Springfield, Ill., from seed of the Northern Muscadine (not the Southern Muscadine, Rotundifolia, erroneously described by others). Vine a vigorous grower, with all the characteristics of its northern parent and not the least resemblance to any other; its *bunch* is large, compact; *berry* large, BLACK with blue bloom; flesh pulpy, juice sweet; ripens about same time as Concord.

Berckmans. (*Rip.-Hybr.*) A cross between *Clinton* and *Delaware*, originated by the late Dr. A. P. Wylie, Chester, S. C. Vine very vigorous and prolific; growth and foliage almost similar to *Clinton*. Bunches and berries larger than Delaware, of same color (pale RED) and quite equal in quality to this favorite variety, uniting the vigor and fertility of the one with the excellent fruit of the other parent. Dr. Wylie considered this variety one of the most promising of his seedlings and named it in honor of his friend P. J. Berckmans, whom he gave it also, to propagate and dissemitate it. In our Catalogue, 1883 edition, we reported it already as proving healthier than Delaware and deserving dissemination. It has since grown and fruited in several localities, East and West, North and South, and sustained all what was expected from it; holds its foliage until frost, proving less inclined to mildew, but liable to be destroyed by *thrips* in some localities. It may nevertheless remain only a grape for amateur collections.

Berks, or Lehigh. (*Labr.*) *Bunch* large, shouldered, compact; *berry* large, round, RED, little pulp, good quality; *vine* vigorous grower, similar to Catawba, of which it is a seedling, and perhaps an improvement in size and quality; but also more subject to disease.

Berlin. (*Labr.*) A Concord seed., originated at Ionia, Mich. by Geo. Hosford. Vine vigorous, hardy, healthy and productive. Bunch large, compact; berries GREENISH WHITE with moderate bloom, resembling the Niagara, moderately juicy, translucent; flavor pleasant, slightly foxy; shipping quality good, except a tendency to drop from the stem; season with Concord.

Bertha. (*Labr.*) A very nice WHITE grape of unknown parentage, originated with Theophile Huber, Illinois City, Ill. Vine very vigorous and a heavy bearer. *Bunch* large, compact, shouldered; *berry* small to medium; pulp tender and sweet; skin thin, but tough and slightly acrid in taste when chewed; ripens a few days after Concord; it would make a very good wine.

Bertrand. (*Rip.*) Syn.: BLUE SEEDLING. An accidental seedling, from Judge J. B. Jones, of Herndon, Middle Georgia, and first reported to the American Pomological Society, session 1885, by T. T. Lyon, chairman committee on native fruits; described as follows: Vine exceedingly vigorous and healthy: *bunches* above medium, sometimes shouldered, sometimes not; *berries* medium, round, BLACK with blue bloom; peduncles long, pulp dissolving, very juicy, vinous and of high-flavored, delicate aroma; skin firm and thin; flesh melting, pulp not perceptible, quality best. Maturity middle of August. A refreshing, delightful grape.

It originated in 1878; when eight years old, bearing its fifth crop, there were upwards of 100 bunches on the original vine and no trace of rot. Our honorable friend P. J. Berckmanns was struck with its healthy appearance and fruitfulness, and now, in 1894, he kindly informs us about the Bertrand: This I consider one of the very best grapes of that type that has come under my observation, and it has the remarkable advantage of ripening when nearly all other varieties of bunch grapes are gone. I have watched this grape since 1886, and it will likely be offered to the trade by a Florida grower who purchased the stock of the Bertrand.

(Figure from nature, slightly reduced.)

Beta. (*Rip.-Hybr.*) Originated by L. Snelter, Carver, Minn.; said to be very hardy, enduring unprotected 50° below zero in Minnesota, bearing good crops.

Big Extra. (*Linc.* × *Triumph.*) See Munson's hyb.

Big Hope. (*Linc.* × *Triumph.*) See Munson's hyb.

Bird's Egg. (*Labr.*) Probably a seedling of Catawba, somewhat similar to *Anna*. *Bunch* long, pointed; *berry* oval, WHITISH, with brown specks; flesh pulpy; only good; a curiosity.—*Downing.*

Bismark. A seedling of Brighton, q. v.

Black Cape. (*Labr.*) See Alexander.

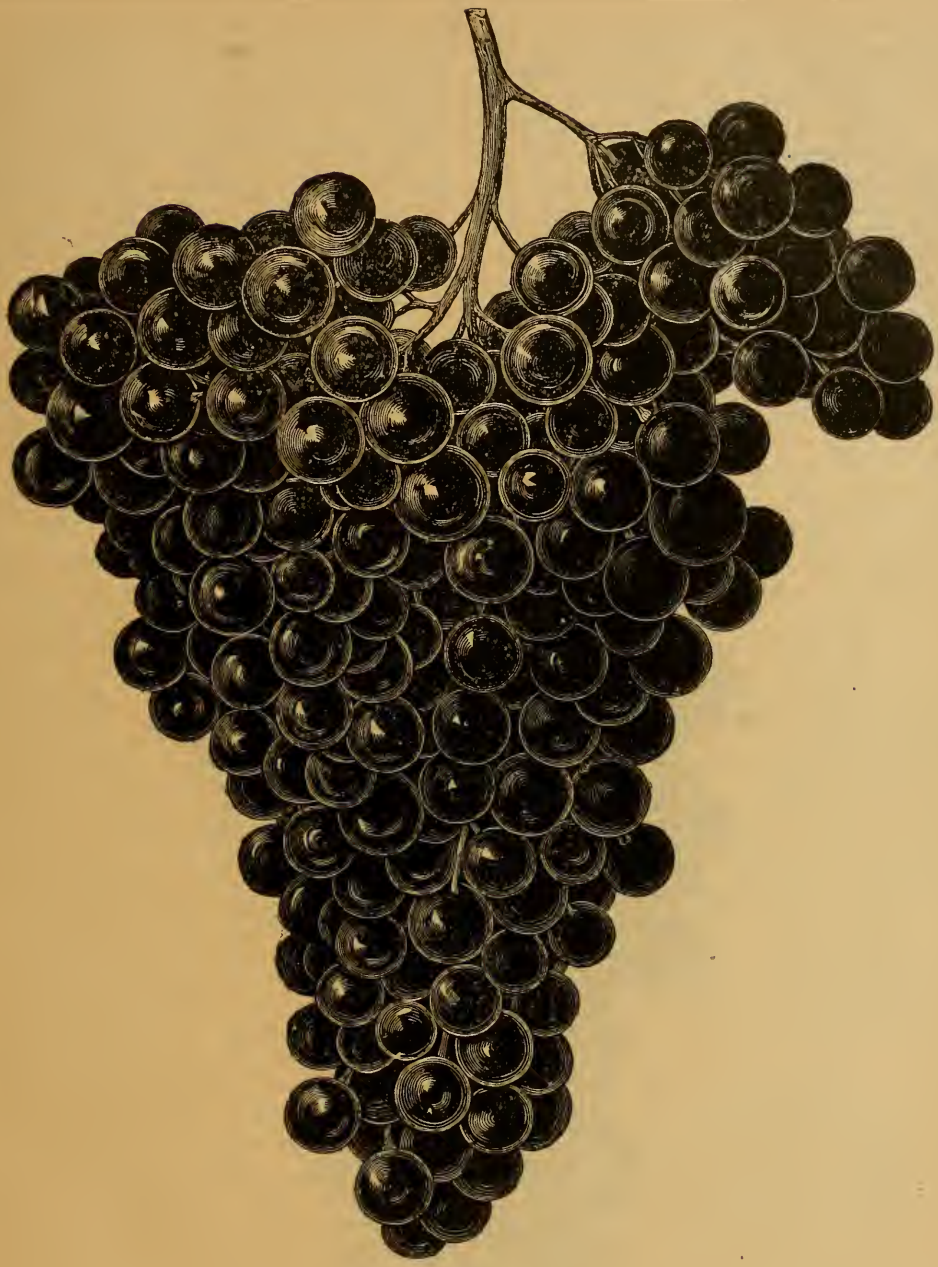
Black Delaware. Originated by Jacob Rommel, of Morrison, Mo. It promised to be a valuable early market grape, and we propagated it and reported it in our third edition of this catalogue, as Delaware Seedling No. 3, but was discarded when it ceased to be healthy. On the experimental farm of the Canadian Department of Agriculture, at Ottawa, it continues, however, very successfully, free from mildew and rot, ripening a few days before Champion and of far superior quality. Well worth trying now.

Black Delaware. (*Labr.*×) See NECTAR.

Black German. (?) See York Madeira.

Black July. (*Est.*) See *Devereaux.*

Black Defiance. (*Labr.-Hybr.*) (Underhill's No. 8-8.) Originated by Stephen Underhill, Croton Point, N. Y. A splendid, late table grape, with us more desirable than *Senasqua*. If we are rightly informed, it is a cross between Black St. Peters and Concord. *Bunch* and *berries* large, BLACK, with a fine bloom; three weeks later than Concord, and much better in quality. Succeeds well, and pleases also in France.



BERTRAND.

Black Eagle. (*Labr.-Hybr.*) (Underhill's No. 8-12.) A Hybrid of Labr. and Vinifera. Originated by same as Black Defiance. A fine, early table grape, of best quality. The leaf is one of the most beautiful we know of, very firm, dark green, deeply lobed, of the shape of the foreign.

The vine is of very erect and vigorous growth, healthy, yet tender, prone to rot, as all other Hybrids of Labr. and Vin.; *roots* straight and smooth, almost tough, with a medium liber; canes remarkably straight and upright, with numerous, but small laterals; wood firm with medium pith; *bunch* large, moderately compact; *berries* large, oval, BLACK, with blue bloom; flesh rich and melting, with little pulp. With *Underhill* the fruit set imperfectly, but it does not show that fault when pollinated from other vines blossoming at same time. We consider it as

"among the best of the hybrid varieties." Berckmans, of Georgia, Chairman of Fruit Committee, said: "*Black Eagle* we found unsurpassed in quality, productiveness and vigor. I have seen bunches that weighed a pound and three-quarters, grown at Macon, Georgia, some years ago; but has not sustained its early good record."

S. A. Beach, Horticulturist of the N. Y. Experiment Station, in his report for 1893 says: It can not set fruit of itself but in our station vineyard where it stands near other varieties it is very productive. The clusters are very large and filled with large beautiful berries. Flesh rich and melting with little pulp. Ripens a little before Wordens. (We are not quite sure and convinced that this fruitfulness is produced by pollen from other varieties *only* and exclusively.)

We give a figure of its bunch and leaf reduced.

BLACK EAGLE. (Reduced.)

Black Hawk. (*Labr.*) A seedling from the Concord, raised by Samuel Miller. *Bunch* large, rather loose, berry large, BLACK, round, juicy, sweet; pulp very tender; ripens full as early as the Concord, and seems to be healthy and hardy. We find it sometimes a little earlier than Concord. It has the remarkable peculiarity that its leaf is of so dark a green as to appear almost black.

Black Herbemont. (*Æst.*) See Munson's Seedl.

Black's Imperial. (*Labr.* ×) Originated by Dr. J. Stayman, from *Duchess*. Vine vigorous, hardy and productive; but somewhat subject to rot and mildew in unfavorable seasons; *Bunch* large, shouldered compact; handsome; *berry* above medium, BLACK; meat tender, juicy rich, spicy, sprightly sweet, vinous, quality *best;* ripens with Concord, will hang on the vines long after ripened.

Black July. (*Æst.*) See Devereux.

Black King. (*Labr.*) A hardy and vigorous early grape, of medium size; sweet but foxy.—*Strong.*

Black Muscadine. (*Rotun.*) See Flowers.

Black Pearl. (*Rip.*) Syn. SCHRAIDT'S SEEDLING. Originator, Caspar Schraidt of Put-in-Bay, O. Probably from seed of Clinton. *Vine*, a vigorous, healthy grower, similar in appearance of growth and foliage to Elvira and Noah. It succeeds admirably on the islands and shores of Lake Erie, where it is very productive. In our heavier clay soils and warmer climate it is less satisfactory both in quality and productiveness; the bunch is not as large and handsome as on the islands and on the lake shore, where it far surpasses the Clinton in appearance, and makes a *valuable* DARK-RED *wine*.

Dr. Warder considered it "an exceedingly promising grape of the *Clinton* class." (Am. Pom. Society, 1877). So did we also consider it, after examining it for several seasons, and admiring its luxurious, healthy growth; we secured from Mr. Schraidt a thousand cuttings and disseminated this variety in 1877, with his consent, under the name of Black Pearl. (He first intended to call it "*Schraidt's* Burgundy," and claimed it to be a seedling from the Delaware). Geo. W. Campbell of Ohio, who had opportunities to observe this grape in his own State, says: "It is a strong growing and very productive vine, and is probably a valuable addition to the limited number of red-wine grapes." And as such only we recommend it *for certain localities*.

In August, 1882, a season of unparalled destruction through mildew and rot in the Mississippi Valley region, E. Baxter, of Nauvoo, reports the Black Pearl grape as exceptionably fine, leaf extra good. A. Wehrle of Middle Bass, the leading wine producer of Ohio, wrote to us that he finds this wine-grape unsurpassed in color; *must* of good saccharine weight and proper degree of acidity; but adds: "It suffers with us sometimes during the flowering season, otherwise it is a most valuable grape, and pays well to the producer."

J. G. Burrow of Fishkill, N. Y., one of our oldest and most eminent vineyardists, says: "I received the Black Pearl from you some fourteen years ago; it has proved very satisfactory with me, never having lost a crop in all this time. Its wine I consider very valuable; it is remarkably dense in body and color."

Black Rose. (*Labr.-Hybr.*) A cross between Concord, *f.* and Salem, *m.* raised by Rautenberg of Lincoln, Ills., in 1884. Resembles Concord in general appearance, is as hardy, ripens at the same time or a little later. *Bunch* like Concord, sometimes shouldered: berries large, BLACK and of fine flavor; has been pronounced by good judges to be equal to the "*Eumelan*" in quality; but, though not *free* from mildew, ripens its fruit better than Eumelan even in a bad season; is well recommended as an amature variety, and in some localities as valuable for wine.

Black Spanish. (*Æst.*) See Lenoir.

Bland. (*Labr.?*) Syn.: BLAND'S VIRGINIA, BLAND'S MADEIRA, BLAND'S PALE RED, POWELL. It is said to have been found on the eastern shore of Virginia, by Col. Bland, of that State, who presented scions to Bartram, the botanist, by whom it was first cultivated. *Bunches* rather long, loose, and often with small, imperfect berries; *berries* round, on long stalks, hanging rather thinly; skin thin, at first pale green, but PALE RED when ripe; flesh slightly pulpy, of a pleasant, sprightly, delicate flavor, and with little or no musk scent, but a slight astringency; ripens late; foliage lighter green than that of Catawba, smoother and more delicate. This vine is quite difficult of propagation by cuttings. The above description of this old variety is from "*Downing's* Fruits of America." The Bland did not succeed or ripen well in the North, and has been lost and abandoned South.

Blood's Black. (*Labr.*) *Bunch* medium, compact; *berry* medium, round, BLACK, somewhat harsh and foxy, but sweet. Very early and productive. (Resembling *Mary Ann*, and has often been confounded with it.)

Bloom. See CREVELING.

Blue Dyer. (*Rip.*) *Bunch* medium; *berries* small, BLACK, very dark juice; promises well for wine.—*Husmann.* (One of many unfulfilled promises!)

Blue Favorite. (*Æst.*) A Southern grape. After Millardet an Æstivalis hybrid with Cinerea and Vinifera. Vine vigorous, productive; *bunch* above medium; *berries* medium, round, BLUE-BLACK, sweet, vinous; much coloring matter; ripe South in September (does not ripen well North); said to be esteemed for wine making.—*Downing.* Unproductive South also.

Blue Imperial. (*Labr.*) Origin uncertain. Vine vigorous, free from mildew, *not* productive. *Bunches* medium, short; *berry* large, round, BLACK; flesh with a hard, acid center or pulp; ripens with Hartford. Inferior.—*Downing.*

Boadicea. (*Labr.-Hybr.*) Copley's cross of Telegraph with Black Hamburg. Produced by Chas. S. Copley, of Stapleton, N. Y., whose hybrids have been exhibited and much admired, about 1875-1880 already, but not disseminated. Vine rather a weak grower—probably in consequence of having been allowed to overbear, which it is inclined to do, and needs thinning out of bunches—leaves dark green, lighter on under side, three to five lobed, varying in shape, some

are nearly round, coarsely toothed; wood short-jointed, of light brown color. The bunch and berry are of good size, closely set, not shouldered; berries oval, no pulp; the flesh is meaty all through, sweet with a rich aromatic flavor; does not crack and has not shown either rot or mildew, so far; keeps well; ripens rather late, between Concord and Isabella. Any one who did not know to the contrary would pronounce it a hot-house grape.

Bottsi. (*Æst.*) The local name for a very remarkable grape, grown in the garden of a gentleman of that name, in Natchez, Miss. It is said to throw all other grapes ever grown there (including the Jacquez) completely in the background, and is claimed to be the true Herbemont brought some fifty years ago from South Carolina. It differs from our Herbemont in color, being of a light pink in the shade, a dark pink in the full sun. The impartial, trustworthy testimony of H. Y. Child, an amateur horticulturist, as to its excellent quality and rapid growth, enormous fruitfulness and freedom from rot, made us procure and plant some wood of this variety.—After several years' testing we found it unsuited to our locality, too tender and liable to mildew. In Texas it is found "a splendid thing," but, as Mr. Onderdonk assures us, "just like the Herbemont."

Boulevard. (*Labr.* ×) Originated by A. Koeth, Charlotte, N. Y., by crossing the Concord with Brighton. Vine vigorous and productive; *bunch* large, compact, shouldered; *berries* medium, greenish-WHITE, with fine bloom; juice sweet, vinous, without foxiness; skin thin but tough, translucent; ripens about same time as Concord.

Brant. (*Rip.-Hybr.*); Arnold's No. 8. Seedling of Clinton crossed with Black St. Peters. The young leaves and shoots dark blood-red; leaves very deeply lobed, smooth on both sides. *Bunch* and *berry* resembling the *Clinton* in appearance, but greatly superior in flavor when perfectly ripe; skin thin, free from pulp, all juice, sweet and vinous; seeds small and few; perfectly hardy; *vine* a strong, healthy grower and sufficiently productive. The bunch hangs firmly to the vine till fall, and the berries adhere well to the bunch. Our illustration of this variety is from a specimen of average size and shape. A very early and desirable grape. It is the most valuable of Arnold's seedlings, and it would be profitable if the birds would not destroy the bunches as soon as they ripen. For localities where grapes ripen later than with us, and where birds are less destructive, it is worthy of the attention of grape-growers. We have seen it growing very finely and successfully at Milwaukee, Wis., in the garden of an amateur.

Our friend Champin gave us a very favorable report of this variety in Northern France (Drôme), where the Brant deserves to be cultivated extensively. It resists, so far, the Phylloxera, and during the six years, that he cultivated it, has increased from year

BRANT.

to year in vigor and fruitfulness. Brant and Canada have often been confounded with each other, and the following may serve to distinguish them: The Brant has the most sinuous, deeply-cut, indented and lobed foliage of any American variety, while that of the Canada is but little indented and lobed, while young. But the form of leaves is very variable, and no reliable distinctive character can be made of them; a more reliable characteristic is their color: that of the Brant is of a

deeper green with a reddish tinge, while that of the Canada is a lighter green with a whitish tinge; and so are the tendrils of the latter of a paler green and only two-forked, while those of the Brant are darker, longer, and often doubly biforked. The Brant has long-jointed red wood; the Canada's wood is rather short-jointed, of less vigorous growth, green, brownish towards the sun. The bunches of the Canada are usually shorter and more compact; those of the Brant are not loose either, but not so very compact as to flatten the berries. The seeds of the Brant are very small, and rarely more than two in a berry. Both ripen very early, and give a wine of excellent quality and of very handsome red color.

Brighton. (*Labr.* × *Vin.*) This handsome and fine grape, raised by Jacob Moore, of Brighton, N. Y., is a cross of the Concord and Diana-Hamburg. *Vine* hardy, a rapid and vigorous grower, with medium to long-jointed shoots, which ripen early; *leaves* large, thick, dark green, glossy, coarsely serrated, occasionally lobed. Very productive, and, if the small bunches were taken off early in the season, it would be a great benefit

BRIGHTON.

to the others. Sometimes, however, its flowers have *stamens with curved filaments* and do not always fertilize, though abundantly blooming; it should, therefore, be mingled with other varieties, growing close by, which have the same time of blooming.

"*Bunch* medium to large, shouldered, moderately compact; *berries* medium to large, round, light red at first, changing to a dark crimson or maroon when fully matured, sometimes almost black, and covered with an abundant lilac bloom. The berries adhere well to the peduncle; skin thin but tough; flesh tender, very slight pulp, sweet, juicy, slightly aromatic, very slightly vinous, and of very good quality for an early grape. It has its best flavor when it first ripens, but becomes pasty and loses its sprightly flavor when fully ripe. Ripens nearly as early as the Hartford and before the Delaware."—*A. J. Downing.*

One of the most considerably grown varieties in the Eastern States, where it is a standard valuable variety and THE LEADING TABLE GRAPE. It cannot be called a good keeper, as it does not retain its fine flavor long after maturity. It is worthy of extensive planting wherever any of the hybrid grapes can be grown successfully and *early grapes* for table or market are desired; requires protection in severe winters and is subject to mildew. The cut is a faithful copy of a photograph from a medium size bunch of the Brighton grape. In general beautiful appearance the Brighton resembles the Catawba, which ripens a month later.

A seedling of Brighton has been raised by Horace Purfield, of Ann Arbor, Mich. (bore its third crop in 1893), which closely resembles the Brighton in every respect, ripens a few days earlier, and is especially distinguished from its parent by its flowers being perfect, having straight stamens; it is being tested in Missouri and Kentucky.

"B SMARK," a seedling of BRIGHTON, produced by E. F. L. Rautenberg, of Lincoln, Ill., is almost a reproduction, except that it is hardier.

In Colorado also a grape similar to *Brighton* in foliage and growth has been grown, by John Gravestock, of Cañon City, Colo.; supposed to be a seedling of this variety.

Brilliant. (*Labr.-Hybr.*) Raised from seed of LINDLEY crossed by DELAWARE, produced in 1883 by T. V. MUNSON of Denison, Texas, who is pronounced by no less an authority than Geo. W. Campbell, "doing more and better work in the way of improving our native grapes than any other grower in the United States, if not in the world." This beautiful RED grape, one of the finest introduced for many years, has been tested by a few eminent horticulturists in various states, south and north, receiving everywhere high praise. *Vine*, a strong grower, healthy, vigorous and hardy, having endured the winters of New York and Ohio with impunity; with large healthy foliage and perfect blossoms; very prolific, (tender in bud at 5° below zero). *Bunch* and *berry* large, about the size of Concord; of excellent quality; skin thin, tough, translucent; brilliant in color, much like Delaware, ripening with the latter and equal to it in quality, which is BEST. Shipped a thousand miles to market it arrived in fine order.

E. Williams of New Jersey, exhibited a medium cluster of the Brilliant, grown by him, at the last meeting of the American Pomological Society (1893) at Washington, D. C., comparing favorably with its parent, the Lindley. He stated: that the Brilliant fruited with him three years with a good degree of satisfaction, that it is somewhat liable to mildew, adding: "But the Bordeaux mixture, properly and seasonably applied, affords the antidote for this trouble." Amateurs in good grape regions will do well to give it an extensive trial.

P. J. Berckmans, who is also President of the Georgia State Horticultural Society, reports: "A thorough test has been made at our State Experiment Station of Munson's hybrids; of them the best, the most promising, so far, appears to be the Brilliant.

Brown. (*Labr.*) A seedling from Isabella, raised by W. B. Brown, of Newburgh, N. Y. Vine a hardy, vigorous grower, with good foliage. *Bunches* of about the size of Concord; *berries* not quite as large; color BLACK; ripens very early—as early as the champion; but of very good quality.

Bundy's Seedling. (*Labr.*) See Coleraine.

Burnet. (*Labr.-Hybr.*) The Burnet grape was raised by P. C. Dempsey, of Albany, Prince Edwards Co., Ont., from seed of the Hartford, fertilized by Black Hamburg. The vine is vigorous and healthy, hardy and productive; leaves deeply lobed, thick, downy beneath; *bunches* large, well shouldered and well filled; the *berries* large, oval, PURPLISH-BLACK; flesh and flavor resembling Black Hamburg, without any trace of foxiness; ripening earlier than the Concord.—Sufficiently early for S. E. Canada, but a poor keeper; desirable for home use only.

Burroughs'. (*Rip.*) From Vermont. Vine allied to the Clinton. *Bunch* small; *berry* round, BLACK, thick bloom; flesh harsh, acid, austere.—*Downing.*

Burton's Early. (*Labr.*) A large, early, poor Fox grape. Unworthy of culture.—*Downing.*

Bushberg. (*Labr.* × *Æst.*) A seedling of Willie, accidentally crossed by Æstivalis (probably Cynthiana, growing adjacent; it has decidedly more of the latter character in wood and fruit than of the Labrusca type); raised by Dr. L. C. Chisholm, of Tennessee, who describes its vine as vigorous and healthy; wood of firm texture; dark green foliage; clusters long and loose, above medium, shouldered; *berry* oblong, BLACK, fully as large as Isabella; entirely free from native, foxy aroma; sprightly and vinous in taste; pulp tender, readily separating from seed; ripens about with the Concord and hangs well on its peduncle.

NOT before it has been fully tested in our vineyard at Bushberg and in other localities, and found worthy and reliable, coming up to all Dr. Chisholm has said of it, shall it be disseminated. Dr. Chisholm who, unsolicited, desires to honor us by giving it this name, says himself that if it does not prove to be all and more than he said it will never see the light; we to be the judge.

BRILLIANT.

Calypso. (*Labr.-Hybr.*) Produced by Charles S. Copley, of Staten Island, N. Y., from seedling of Lady × with pollen of Secretary (Rickett's), combining three species. First fruited in 1887. The *vine* is hardy, healthy and productive; needs thinning to one bunch to the spur, and fruiting only on strong spurs. Leaves covered with white down on the under side, coarsely serrated, not much lobed. Bunches large, heavily shouldered, and berries very large, BLACK, of best quality; no pulp; very juicy, sweet and vinous, of rich cherry flavor; sets its fruit much better than the Secretary; ripens soon after Concord. The two largest bunches weighed 1 lb. 3 oz. each, and the American Institute awarded it the medal of excellence.

Cambridge. (*Labr.*) Originated in the garden of Francis Houghton, Cambridge, Mass., and introduced by Hovey & Co., of Boston, as "of the highest merit." It is a BLACK grape, somewhat resembling Concord, but with more oval berries. *Bunches* large and shouldered; *berries* large, with a very thin skin, covered with a delicate bloom, and adhering firmly to the bunch; flesh rich, brisk, and refreshing; without pulp. Period of ripening a few days before the Concord. The vine has the luxuriance of growth and handsome foliage of the Concord; it is quite as hardy as that grape.

In some favorable seasons, the Cambridge produced in our vineyards much finer, larger bunches than the Concord; generally, however, it is nearly indentical in taste and appearance with this most popular variety.

Camden. (*Labr.*) *Bunch* medium; *berry* large, GREENISH-WHITE; flesh with hard centre; acid; poor.

Campbell. (*Labr.-Hybr.*) See Early Golden, by T. V. Munson, page 119.

Campbell's Early. (*Labr.-Hybr.*) A most promising new grape. "An improved Concord," produced by different crosses from Hartford, Concord, Moore's Early, through Muscat Hamburg, selecting the hardiest and healthiest foliaged hybrids for succession. Our venerable and venerated friend, G. W. Campbell, is still experimenting, for about 15 years, directing his efforts towards the production of a grape having all the good qualities of the Concord, with its faults eliminated. American grape culture owes already to friend Campbell several valuable additions, but from the success, so far, of this variety it will undoubtedly prove his *greatest triumph*, as it seems to be the nearest approach to a perfect grape for general cultivation. In growth and foliage it is as vigorous and healthy as the Concord, ripening *earlier*, with Moore's early: its *bunch* is large, shouldered; *berries* large, globular (see title page illustration, after a photograph of a medium cluster from the original vine), BLACK, with a beautiful blue bloom; flavor rich, without foxiness, flesh a little meaty, sweet to the center, with small seed, parting freely from the pulp. Skin thin but tenacious, hanging to the vine without dropping its berries and remaining in sound condition, without deterioration in quality until severe frost strips its foliage. It is *really* an *improved* Concord, in *no* respect inferior to it; and he is justly confident that "Campbell's Early" will be prized and remembered long after its originator shall have passed away.

He may be well satisfied with the record this grape has made and can scarcely wish anything better than simple continuance in well-doing.

The photogravure expressly made for this catalogue is an exact reproduction, it is *not* exaggerated a hair's breadth in size.

The publication of this catalogue has been purposely delayed until fall 1894; (much time, care and work has been devoted to its revision. Grapes are now fully ripe). "*Campbell's Early*" has fulfilled all its promises, though late frosts in May, drought all July to August, were rather unfavorable. All who saw the vines are unanimous in their admiration, all who tasted the fruit pronounce it "excellent," all that could be desired. The foliage is grand; some measuring 9 by 10 inches without the petiole; the vines can be distinguished at quite a distance, it is of a very dark green; the clusters hang full and large on them. One was sent to the Department of Pomology at Washington (about September 1, 1894) where a painting has been made from it. Mr. Irwin, the assistant Pomologist writes: "Everyone in the Division is greatly pleased with it. There were 71 grapes on the cluster, the largest measuring one inch in diameter, caliper measure. I really believe you have the grape that has more good points than any now in cultivation." And afterwards, Prof. S. B. Heiges, Pomologist and chief of the Division, wrote to Campbell as follows: "Your cluster of Campbell's Early, received September 5th, for which accept my sincere thanks. The cluster was undoubtedly a very fine one, reminding me of a small cluster of Black Hamburg grown under glass. We found some of the berries to be one inch in diameter; the quality is remarkably fine, pulp sweet to the center, with small seeds easily divided from the pulp; the skin thin, but tenacious, making it a very valuable shipper. Color a beautiful black with heavy bloom. We have had a painting made of the largest leaf, 9½"x9½", with the bunch resting upon it."

Everything about the Campbell's Early is "immense"; and they have not been pampered, were grown for wood more than for fruit. Health and vigor remained perfect throughout the season. This was the fourth year's fruiting. It will be introduced and disseminated in 1896.

Canada. (*Ripa.-Hybr.*) (Arnold's No. 16.) Raised from seed of Clinton, crossed with pollen of Black St. Peters. Resembles the Brant (Arnold's No. 8). [For characteristic differences see Brant, p. 84.] It is justly praised for its rich aromatic flavor and delightful bouquet by all who taste it. *Bunch* small, *berry* medium, tapering toward the pedicle to which it adheres firmly; color BLACK, with a fine bloom; skin thin, free from harshness and from the acidity common to many other native grapes. A moderate grower, with peculiar foliage; hardy, and matures its wood well. Valuable for wine in some localities.

Like all of Arnold's Hybrids, it proves tender and unreliable in the United States, in most localities, while in France it is very successfully grown and proves Phylloxera-resisting. But this is not to be construed as a general and absolute condemnation for all parts of our country, nor as a recommendation for all the different regions of viticulture in France. The Cornucopia and the Canada have perished at Nîmes, while they have been growing and succeeding finely during many years in the valley of the Saône. The principle of adaptability to certain soils, aspects and localities, and not to others, applies to hybrids in a greater degree even than to varieties of our native species.

Canby's August. (?) See York Madeira.

Canonicus. (*Labr.-Æst.*) Originated by D. S. Marvin of Watertown, N. Y., by crossing the Worden with Eumelan, about 1888. Vine vigorous, healthy and productive; bunch rather loose, medium; berry above medium, round, PALE GREEN; translucent and covered with whitish bloom, pulp sweet, tender, juicy and sprightly, skin thin; ripens with Concord. It is well worthy of trial and may prove a desirable acquisition.

Cape. (*Labr.*) See Alexander.

Carlotta. (*Labr.*) Produced by the late T. B. Miner, Linden, N. J. Vine vigorous and hardy, bears a greenish WHITE grape with considerable bloom, of good quality; it may fairly rank with the best white grapes of the Labrusca; bunch and berry full medium. "Fully as good as *Coleraine*, Hayes, Esther, Empire State."—

Rural New Yorker, September, 1893.

Carman. (*Linc.×Æst.*) A seedling of Post-oak crossed with Herbemont; originated by T. V. Munson, Denison, Texas. Vine very vigorous, productive, healthy and hardy; leaves out, sheds and blooms late; *bunch* beautiful, very showy, compact, large, conical; *berry* large, BLACK, with little coloring matter; seeds small; skin thin but tough; pulp meaty with sweet juice of very good pure flavor and fine quality. Ripens late, about same time as Catawba.

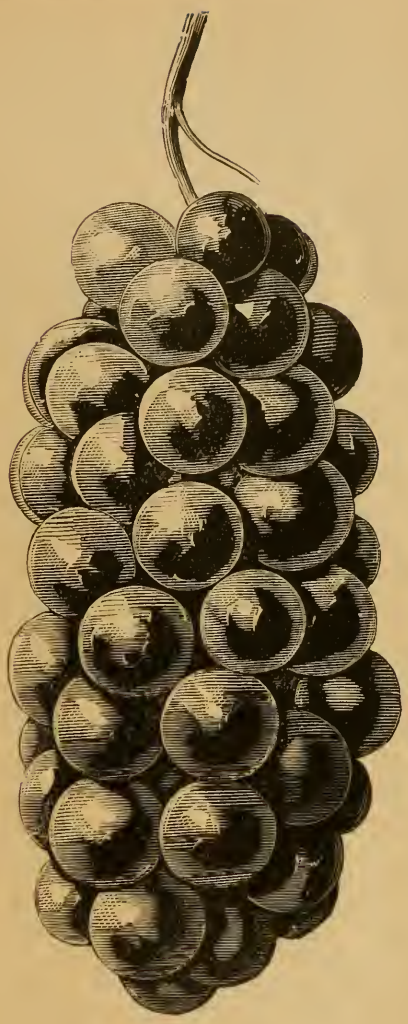
Carter. (*Labr.*) See Isabella.

Casper. (*Æst.*) See Louisiana.

Cassady. (*Labr.*) Originated in the yard of H. P. Cassady, Philadelphia, as a chance seedling. *Bunch* medium, very compact, sometimes shouldered; *berry* medium, round, PALE GREEN, covered with white bloom; when very ripe its color changes to light yellow; skin thick and leathery, pulpy, but with a peculiar honeyed sweetness which no other grape possesses in the same degree. Ripens with the Catawba. Vine a moderate grower; a true Labrusca in habit and foliage; immensely productive, so much so that nearly every fruit-bud will push out several branches, with from three to five bunches each. But after thus over-bearing it becomes exhausted for several seasons, the leaves drop prematurely, and the fruit will not ripen.

This grape is now generally discarded, being replaced by new and better varieties. It is said to be the parent of the "*Niagara*" grape.

The "Arrott" resembles the Cassady very much.



CANADA.

Catawba. (*Labr.*) Syn.: RED MUNCY, CATAWBA-TOKAY, SINGLETON. This old and well-known variety, one of the pioneers of American grapes, is a native of North Carolina, and has its name from the Catawba river. It was transplanted to a garden at Clarksburg, Md., and introduced to notice over seventy years ago by Major John Adlum, of Georgetown, D. C. It has been for many years the standard wine grape of the country, and thousands of acres have been planted with it; but owing to its uncertainty, on account of the mildew and blight, and its too late ripening in the Northeastern and North-

ern States (in October), it is now discarded in many sections, and other reliable kinds are planted instead. In localities where it will fully mature, and where it seems less subject to disease, there are very few better varieties. The State Experiment Station of Georgia reports (1891-1893) "Less liable to rot than formerly; *regaining its old standard.*" Would, that this be the case in many localities!

It is too generally known to require portrait or illustration by engraving.

Contrary to the heretofore prevailing belief that the Phylloxera was the main cause of the failure of the Catawba in many sections, we have come to the conclusion, based upon careful observation, that the diseased and enfeebled roots of the Catawba are caused by the disturbed development of the mildewed tops, and *not* by the Phylloxera. Where mildew does not prevail, as on the islands of Lake Erie, on the lake shore, &c., the Catawba is still and will deservedly remain for years to come the leading variety for market and for wine.

The late Dr. Warder truly said, that the beautiful banks of the Ohio might again be covered with vineyards, if we could only discover a grape, equal in quality to the Catawba, that would not be subject to mildew or rot.*

Bunches large, moderately compact, shouldered; *berries* above medium, round, deep RED, covered with lilac bloom. Skin moderately thick; flesh slightly pulpy, sweet, juicy, with a rich, vinous, and somewhat musky flavor. Vine a vigorous grower; in favorable seasons and localities very productive. Clay-shale soil, also gravelly or sandy soils seem best adapted. *Roots* light, in comparison to the naturally strong growth of the vine, when in a perfectly healthy state, with a texture below average hardness; thick liber, and not inclined to push young fibers as rapidly as other varieties; canes straight and long, with few laterals; wood of average hardness, with a pith a little more than the average size. *Must* ranges from 86° to 95° by Oechsle's scale.

* At the moment that we were reading the proof of this, for the third edition of this catalogue, we noticed in the *Messager Agricole* (August, 1883), the following, which we translated:

Certain Remedy against the Mildew (Peronospora). Jean Gazotti, a modest Italian grape-grower, had the happy idea to sprinkle the foliage of mildew infected vines with a solution of soda (2 kilos of soda in one hectolitre of water=4½ pounds dissolved in 26 gallons of water), and he had the good fortune to find on the day after such treatment, that the filaments of the peronspora were consumed.

While we scarcely venture to hope that this will be a certain remedy, it is well worth trying. May the results be satisfactory!—It proved no remedy; but was a great step towards the discovery of a preventive.

The *Catawba* has quite a number of SEEDLINGS; of *Diana*, its best, and of *Aletha*, *Anna*, *Hine*, *Mottled*, etc.. we give descriptions in their alphabetical order; but some are actually the same as *Catawba*, and only pretended seedlings, to sell under a new name; others are so nearly identical as not to require description. To this class belong:

Fancher, claimed to be an early Catawba.
Keller's White; Mead's Seedling; Merceron.
Mammoth Catawba of Hermann, very large in bunch and berry, but otherwise inferior to the parent.
Omega, exhibited in 1867.
Saratoga, the same as Fancher.
Tekomah, a Missouri seedling of *Catawba*.
White Catawba, raised by John E. Mottier, and abandoned by himself as being inferior to its parent.

Catawissa. See Creveling.

CAYWOOD'S HYBRIDS, produced by the late A. J. Caywood of N. Y.:

No. 1. (*Labr.* ×) A RED grape, obtained from a Seedling of "*Pokeepsie*," crossed with *Iona*, was not named and is, probably, lost. Even Mr. Barns, a prominent horticulturist, living four miles from Caywood's place, and M. J. Bailey, a fruit grower at Marlboro, N. Y. who, both, knew A. J. Caywood, personally, could give us no information about it.

No. 50. Reported by several Experiment Stations as received for testings in 1888-1889 from its originator, say only that it "gives promise of value for the market;" it has, evidently, never been disseminated.

A quarter century ago, the late A. J. Caywood, then of Poughkeepsie, N. Y. became first known as originator of the WALTER grape. He was a very enthusiastic and successful hybridiger, producing the following named (12) varieties: * DUCHESS, FLORENCE, HUDSON, MABEL, MODENA, METTERNICH, NECTAR, POKEEPSIE, ULSTER, WALTER, WHITE CONCORD, and WHITE ULSTER. They were all very prolific and of fine quality; but poor Caywood, like most grape growers, was unsuccessful financially. He became dissatisfied, somewhat quarrelsome and indifferent about his affairs, to which poor health, probably, contributed. He died in 1889; the following year his son Walter (his associate, firm Caywood & Son, Marlboro', N. Y.), and about one year thereafter Mrs. Caywood also died. No complete record of his work and once promising productions seems obtainable; his Vineyard and Nursery have gone to grass, and his few surviving children seem not to care.

Cayuga. (Hybrid between Labrusca and Vinifera, or Æstivalis ?) Syn.: SHARON. Originated by D. S. Marvin, of Watertown, N. Y., from a seedling of Eumelan crossed with Adirondack. Vine not a vigorous grower; *bunch* of good size; *berry* much like *Isabella* in shape and size, BLACK, with a beautiful bloom, vinous, of excellent quality; season very early, as Champion, if it were only as vigorous; it is one of our best and handsomest grapes, but *not* very hardy.

* The date of their production or dissemination we could not ascertain; we therefore give them in Alphabetical order only, and refer to their description in this Catalogue.—B. & S. & M.

Centennial. (*Est.* × *Labr.-Hybr.*) Originated by D. S. Marvin, of Watertown, N. Y., cross between Labrusca and an Eumelan seedling, taking mostly after the latter. In 1875, when it first fruited, Mr. Marvin sent us a specimen bunch of this grape; it then resembled Delaware so much that we said it need not be introduced as a different, new variety. But seedlings sometimes change greatly and need to be fruited longer before introducing. In Northern New York it was a vigorous grower, with heavy foliage, but here, in Missouri and many other localities, it was too much subject to mildew. Where it does well it is a delicious grape; the clusters are not large, but of fine, conical shape, always compact; the *berries* medium, round, of peculiar handsome yellowish GREEN to AMBER color, with a light pink shade; skin firm, with but little pulp, juicy, sweet; ripens a few days later than Concord and keeps well for winter use.

This grape was awarded silver medals, certificates and money prizes at many fairs; and by

being hereafter successfully protected from downy mildew may succeed over a wider range of our country and prove a valuable grape. We consider it a fine amateur grape. See figure.

At the New York Experimental Station the Centennial proved a medium grower only, yet healthy in wood; foliage scant; should have been thinned; bunch medium size; berries small; color green on one side with a red blush in the sun. Valuable for amateur collections only.

Challenge. (*Labr.-Hybr.*) Supposed cross between Concord and Royal Muscadine, grown by Rev. Asher Moore, New Jersey. Very early and prolific; *bunches*, short, compact, shouldered; *berries* medium to large, round, pale RED, with flesh slightly pulpy; very sweet and juicy. Extra hardy wood and leaf; ripens evenly and late.

We consider it purely native, yet an excellent dessert and wine grape.

Champion. (*Labr.*) Syn.: EARLY CHAMPION, TALMAN'S SEEDLING, BEACONSFIELD. In 1873 the late President Wilder asked, "Does any one know anything about the Champion?" And the late Dr. Swasey, of Louisiana, then informed us that it was a new grape, extra early, and one of the best in cultivation. (Am. Pom. Soc., 1873, page 66.) In our catalogue, edition 1875, we gave the best description we could then obtain. But while it was said that the Champion had originated in one of the city gardens of New Orleans, La., an accidental seedling, "where it has so magnificently flourished and borne its splendid fruit," and "evaded the notice of our grape-growers for a number of years," we found that this was not so: that R. J. Donnelly, at Rochester, N. Y., and J. I. Stone, at Charlotte, Monroe County, N. Y., propagated and disseminated the "Early Champion," apparently the same grape, before 1873, and that under the name of TALMAN'S SEEDLING, or TALMAN, this identical variety had been grown around Syracuse and other New York localities. It has proven *the earliest* market grape, and has been a profitable one to some growers, but it is so poor in quality that the better known it is the less saleable does it become; and it should be discarded for better varieties. Years ago it was shipped to Montreal and other Canadian markets, commanding there high prices, and, as the vine was found to succeed well and to bear abundantly in the neighborhood of Montreal, young Donnelly, who was then manager of the Beaconsfield vineyards, planted there several thousand of his father's Champion vines, and caused them to be planted quite extensively in the vicinity. Thus it became known as the *Beaconsfield grape*. It was decidedly a profitable grape, selling at high prices on account of its earliness, before other grapes could be had—and until people became more appreciative of *quality*.

The *vine* is a strong grower, thrifty and hardy, with healthy foliage, entirely free from mildew, and very productive. *Bunches* large, handsome, compact, and shouldered. *Berry* round, BLUISH-BLACK, nearly as large as *Hartford;* skin thick, firm, and adhering well to the stem. Ripens nearly one week earlier than *Hartford*, but is as poor, if not poorer, in quality.

In an address delivered by Geo. W. Campbell before the students of agriculture, Ohio State University, he said: "Its quality is so very poor that if the choice were between the Champion and none, I would never taste a grape during my natural existence. And still I have been told repeatedly, by several large growers of grapes for market, that they have made more money from the same area of the plantations of the Champion than from any other variety."

This grape does the best on a warm, sandy, not very fertile soil.

Under the name of *Champion*, as also the *Golden Champion*, another grape was introduced in California, which proves there a miserable failure.

Chandler. (*Labr*) Believed to be from Worden seed; received at New York Experimental Station in 1892, from N. M. Chandler, Ottawa, Kan. A WHITE grape of good quality and said to be very hardy and a fair cropper. Not yet tested.

Charles Downing. (*Est.-Hybr.*) See Downing.

Charlotte. (*Labr.*) Identical with Diana.

Charter Oak. (*Labr.*) A very large, coarse, native Fox grape, quite worthless, except for size, which makes its appearance as attractive as its musky flavor is repulsive.

Chautauqua. (*Labr,*) A chance seedling from the Concord, originated in the vineyard of H. T. Bashtite, near Brocton, Chautauqua County, N. Y. Similar to Concord; BLUE BLACK, its extra large berries make it attractive; said to be of excellent flavor and quality, not yet sufficiently tested.

Cherokee. (*Est.*) Originated by Dr. J. Stayman of Leavenworth, Kan., from the same lot of seed as the *Ozark*. Vine a strong grower, vigorous and productive; free from rot and mildew on its originator's ground; about of the character of Cythiana. Bunch large, compact; berries medium, BLACK, tender, juicy, sprightly, vinous, sweet; ripens rather late.

Chicago. (*Labr.*) A chance seedling found growing on the streets of Lincoln, Ill., whence E. F. L. Rautenberg, a well-known, successful amateur horticulturist, transplanted it to his vineyard. The peculiar light color of its tough, leathery foliage attracted his attention. The vine, so far, has been perfectly healthy, a good grower and very productive, never missed a crop since first bearing, and went through a very severe winter uninjured, while Duchesse, by its side, froze. *Bunch* medium, sometimes double; *berries* medium, round; skin tough; the berries hang very tight on the peduncle; color RED, resembling Delaware; juice very sweet, rich; a good shipper, retaining long its freshness; has been sent by mail from Illinois to New Jersey without destroying the bunch; ripens early, between Hartford and Delaware. May prove, therefore, a good market variety.

Chidester Nos. 1, 2, 3. (*Labr.*) Originated by C. P. Chidester, of Battle Creek, Mich. We make an exception with regard to these. As a rule we do not quote and describe unnamed varieties; but these were introduced by the above numbers and name of its producer since 1885, and are highly commended under said designation only, again in January, 1894, at the Michigan State Horticultural meeting, by all who saw and tasted them. No. 1 was named President Lyon, but this name was subsequently bestowed by T. V. Munson, of Texas, on one of his hybrids, and Chidester later exhibited his new varieties as Nos. 1, 2, 3, at the Michigan State Horticultural meetings, gaining recommendations, as giving decided promise of value for market, especially North, where but few varieties succeeded.

No. 1 is excellent in quality, but a very thin bearer.

No. 2 is not only best in quality, but has a remarkable vigorous growth, with very large leaves, and is very productive. Bunch and berries resemble Concord, except being of a little lighter color, very juicy and sweet; pulp tender and ripening as early as Worden, adhering firmly to the stem and keeping well until about 1st of November.

No. 3 resembles the Concord very closely in vigorous growth, color and productiveness, but its berries are one-third larger, about the size of Moore's Early, or even larger. *Bunch* medium size, very compact, not shouldered. Flesh firm, but juicy and sweet; quality good; adheres to the stem; ripens with Concord, and keeps well, without cold storage, till January 1st.

Christie's Improved. (*Labr.*) See Isabella.

Christine. (*Labr.*) See *Telegraph*.

Cigar Box. (*Vest.*) See Ohio.

CLARA. (¼ size).

Clara. (*Vinif.*) Supposed to be from foreign seed. A WHITE (or pale amber) grape; very fine for the table; somewhat like Allen's Hybrid. *Bunch* long, loose; *berry* medium round, yellowish green, transparent, without pulp, sweet and delicious, but very uncertain. Rather tender and requires protection in the winter. Not worthy of cultivation since we have so many superior varieties. Nevertheless we hear it praised in France as one of the American varieties doing remarkably well there, being vigorous and productive, apparently Phylloxera proof in the midst of badly infected vines (in the vineyard of M. Borty, at Roquemare). We are inclined to believe that the name is incorrect. The above figure of the Clara grape is reduced to ¼ of its natural size (½ diameter).

Claret. (?) A seedling of Charles Carpenter, Kelly Island, O. *Bunch* and *berry* medium; CLARET RED; acid; vine vigorous; not valuable.—*Downing.*

Clarissa. (*Hybr.*) A seedling of Salem, produced by Rantenberg, of Lincoln, Ill., and considered his finest flavored WHITE grape. Resembles *Eldorado* in color and flavor, but is hardier, yet also not sufficiently productive. The vine is a medium grower, with long-jointed wood; it stood 20° below zero without protection or the loss of a single bud; the *bunch* has been only medium to small, but may improve with age, the vine being yet very young. Deserves careful nursing.

Cleopatra. (*Labr.*×) A cross between Faith, m., and Ives, f.; produced also by Rantenberg, of Lincoln, Ill. An extra early BLACK grape. Vine a good grower, hardy, healthy and very productive; but, like most very early varieties, its quality cannot be recommended, though preferable to Champion, Hartford, and their like. Bunch and berry medium; there are better ones out, and this should not be disseminated.

Clevener. (*Vest.*) Considered by some to be identical with a grape cultivated in Switzerland under the name of Clevener, a Burgundy grape of Europe. Prof. Munson regards these varieties, such a *Clevener*, as Northern representatives of the Vitis Bourquiniana, while the Southern type of the species is seen in the Herbemont. We believe the Clevener to be the same as our Louisiana and Rulander. (See description and history of these in this catalogue.)

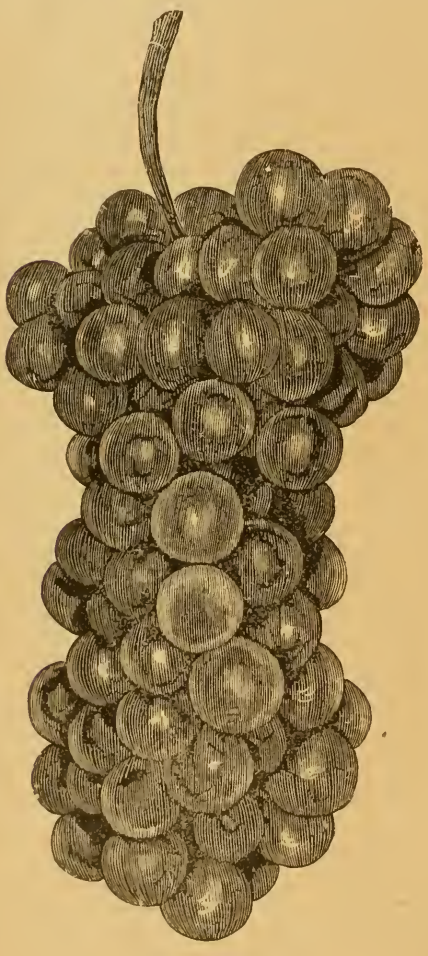
Clevener. (*Rip.*) Quite different from the above; is a member of the American Riparia class—formerly considered the Cordifolia, for its heart-shaped (or slightly tri-lobed) foliage.—It is grown to some extent around Egg Harbor City, N. J., for more than a quarter century and was probably named by emigrants from the Duchy of *Cleve*, near Düsseldorf; certainly not for any resemblance to the European grape of that name, but in memory of the fine old castle of their native home, known as the Schwanenburg, made familiar by Wagner's opera of Lohengrin. The plant has a very vigorous growth and blossoms profusely, being one of the earliest to bloom; sometimes it sets its fruit in medium-sized, compact clusters, which are BLACK when ripe and scarcely distinguishable from the *Diogenes* (see Ironclad); it is also considered rot-proof, making a very dark—in fact, inky--wine (which, however, loses much of its inky character with age). The ripe fruit produces a sugary must with a very small proportion of acid, and it would be one of our most reliable grapes, except that it often fails to properly set its fruit, producing in consequence, scraggy bunches with sometimes only a few berries to the bunch. It is one of the first to color, but one of the last to ripen—and is now replaced by better varieties.

Clifton. (*Labr.-Hybr.*) Originated by Chas. S. Copley of Staten Island, from a crossing of Telegraph (Labr.) with W. Frontignan (Vin.) The vine a strong grower, hardy, healthy and productive; *wood* light brown, short-jointed; leaves 5-lobed, coarsely toothed, leaf-stalk light green and color of leaf the same. The bunch as large as Lady Washington and fills up very solid, not shouldered. The berries are WHITE, very large; require thinning out to show at its best, the bunches also require thinning; the stem is very short. Liable to mildew in unfavorable season.

Clifton's Constantia. (*Labr.*) See Alexander.

Clinton. (*Rip.*) Syn.: WORTHINGTON. *Strong* says that, in the year 1821, the Hon. Hugh White, then in Hamilton College, N.Y., planted a seedling vine in the grounds of Prof. Noyes, on College Hill, which is still remaining, and is the original Clinton. *Bunches* medium or small, compact, not shouldered; *berry* round, below medium size, BLACK, with a heavy bloom; skin thin, tough; flesh juicy, with little pulp, brisk and vinous;

somewhat acid; sweeter the farther south it grows; colors early, but should hang late (until after the first frost) to become thoroughly ripe. Vigorous, hardy and productive; healthy, but an exceeding rank, straggling grower, and one of the hardest vines to keep under control; it requires a great deal of room and spur-pruning on old wood to bring forth its best results. Being one of the first to bloom in spring, it suffers sometimes from late frosts.



CLINTON.

The leaf of the Clinton is in some seasons quite infested by the gall-louse (the Gallicola form of the Phylloxera), but its root enjoys perfect immunity from the puncture of this dreaded insect. The root-lice are found thereon abundantly, but the vine does not suffer therefrom, while European vines by their side are quite destroyed. The Clinton was therefore recommended by us to Phylloxera-invaded France, and has been largely used there for several years, until the Taylor and, even more so, certain types of wild Riparia were found better adapted.

L. Giraud, President of the Syndicat Pomerol. (Gironde), wrote May 4, 1883: "My grafts of 1876, on the poor decried Clinton, give promise of the most satisfactory returns. I have abandoned the grafting on Clinton, and prefer now the Riparia, on account of the large quantity of root-lice on the former, which makes it a bad neighbor for our French vines."

The fact that Clintons, even when teeming with Phylloxera, are comparatively free from mildew and rot, while other varieties much less infected by the insect suffer either by rot or mildew, and some even by both, refutes the theory that these diseases might be caused by the Phylloxera.

Roots thin and wiry, but very tough, with a hard, smooth liber, rapidly forming new fibers, or spongioles. Canes slender, but long and rambling, with a full complement of laterals and strong tendrils. Wood rather soft and with a large pith.

Makes a fair, dark red wine, resembling claret, but of somewhat disagreeable taste, which, however, improves with age; *must* 93° to 98°.

Clinton-Vialia. (*Rip.*) By some supposed to be identical with *Franklin;* others say that the foliage of the Vialia is larger and darker, and that it is more productive and of a somewhat better quality. It is not known here, but it is esteemed in France as a superior grafting stock.

Cloanthe. (*Labr.*) See Isabella Seedling.

Clover-street Black. (*Labr.-Hybr.*) Raised by Jacob Moore, from *Diana*, crossed by Black Hamburg. *Bunches* large, compact, shouldered; *berries* large, roundish, BLACK, with a dark violet bloom; flesh tender, sweet. Vine moderately vigorous. Ripens with Concord.—*Horey's Mag.*

Clover-street Red. (*Labr.-Hybr.*) Same origin as the preceding. *Bunches* larger than the Diana, loose, occasionally with a similar long stalk or shoulder appended to the top; *berries* large, roundish-oval, CRIMSON when fully ripe, with a slight Diana flavor. Vine a strong grower. Ripens with Diana.—*Horey's Mag.*

Cochee. (*Supposed Labr.-?*) Originated by the late John Burr (about the year 1887) from mixed seed. Vine, as nearly *all* his seedlings, very vigorous, hardy and productive, free from rot and mildew, on the original vine; not long enough tried elsewhere. *Bunch* medium, shouldered, compact; *berry* medium RED; pulp tender, very juicy, rich, sprightly, sweet; quality fine; ripens about with Concord.

Coe. (*Labr.*) This grape originated in Washington County, Iowa. *G. B. Brackett,* chairman fruit committee, now director of Experiment Station, kindly described it for this Catalogue (1883) as follows:

"Vine a strong and free grower; withstands the vicissitudes of our climate well; canes rather short-jointed, with healthy, durable leaf. *Bunches* small, compact, rarely shouldered; *berries* small to medium, BLACK, rather fleshy than juicy. Ripens a week to ten days before Concord."

Now (September, 1894) Brackett considers it less valuable than twelve years ago, as we have so many new grapes that are better.

Colerain. (*Labr.*) A white Concord seedling, originated by the late David Bundy (died in 1893), of Colerain, Ohio. A white grape of excellent quality, first brought before the public in 1885. *Vine* vigorous and healthy, equaling its parent in growth; a good grower, hardy and an abundant bearer. *Foliage* strong, with no tendency to mildew. *Bunches* shouldered, compact; clusters of full medium size, both bunch and berry; *color* LIGHT GREEN, with delicate whitish bloom. *Skin* thin and tender; *flesh* juicy and remarkably sweet, of fine quality, vinous, with generally but one seed to the berry. *Ripens* early, a week or more before Concord, and hangs well on the bunch. It is in many respects similar to the *Witt* (see description), only somewhat smaller in fruit and in some locations less productive though of more vigorous growth. Propagates easily and has been favorably recommended wherever tested.

Colorado. Similar to Brighton, q. v.

Columbia. (*Rip.*) This grape is said to have been found by Maj. Adlum on his farm at Georgetown, D. C. A vigorous grower, productive; *bunch* small, compact; *berry* small, BLACK with a thin bloom, with very little hardness or acidity in its pulp; not high-flavored, but pleasant and vinous; ripe last of September.—*Downing.*

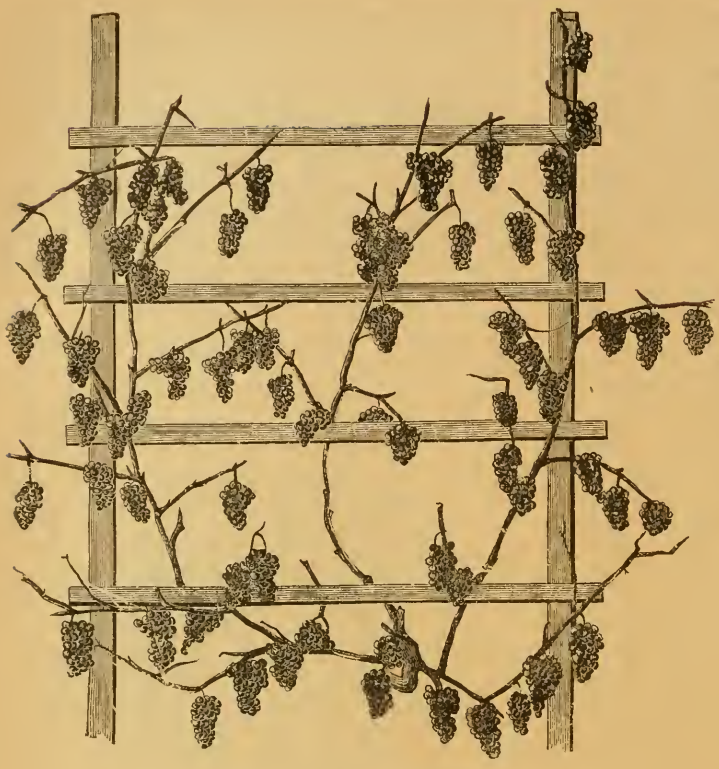
Columbian. (*Labr.*) A chance seedling, parentage unknown; introduced by The Columbian Grape Co., Kingston, O. Vine claimed to be a strong grower with large, thick, leathery leaf. *Bunch* and *berry* similar to *Moore's Early;* BLACK, of high favor in its locality as a market and table grape, by the very large size of its berries, showy and of fine quality, and early ripening—extolled by agents. It was exhibited at the great Columbian Exposition or World's Fair and since, at all the State Fairs, in fall of 1894. From what we have seen it does not give promise of being a good shipper nor of fine quality, this may be due, however, to severe drouth and premature gathering this year.

Columbian Imperial. (*Labr.* × *Rip.*?) Syn.: JUMBO. A chance seedling, originated with J. S. McKinley, Morgan, Orient P. O., Ohio, in 1885; supposed to be an accidental cross between some Labrusca and Riparia variety. *Vine* very hardy, robust and of vigorous growth, very prolific and free from fungoid disease. *Leaf* large, bright and smooth, not deeply lobed, obtusely serrated. *Bunch* large and attractive, compact, double-shouldered; *berries* very large, some measuring 1¼ inches in diameter, of deep BLUE-BLACK color, overspread with a heavy bloom; skin very tough; *pulp* sweet and very juicy, separating very freely from the seeds, which are small for so very large a berry. Quality good; ripens, in Ohio, the latter part of August; clings to the stem with tenacity and has fine keeping qualities, finally drying up into a fair quality of raisins.

Promises to be a great acquisition to our list of market grapes. Yearling vines of this variety are to be distributed under restrictions among experimental stations and viticulturists (in fall of 1894) for testing. This "big grape" was first brought to notice at the Columbian Exposition in the Horticultural Department of the great World's Fair in Chicago, admired by thousands and receiving a large number of valuable testimonials (among others, from Geo. A. Manning, chairman Horticultural Committee, World's Columbian Commission).

Concord. (*Labr.*) This most popular American grape originated with E. W. Bull, Concord, Mass., who exhibited it for the first time in September, 1853, at the twenty-fifth annual exhibition of the Massachusetts Horticultural Society, on Boston Common. It advanced steadily and securely in public favor until it occupies to-day the most important position in the estimation both of grape-growers and grape-consumers as the most valuable variety for general use, and the low price at which it is offered places it within the reach of all. We all recognize its faults or shortcomings,—said *Campbell*—but its good qualities, in the way of hardiness, health, vigorous growth, great productiveness, fine appearance and fairly good quality,—combined with remarkable adaptability to almost every condition of soil and climate where grapes can be grown, justly give it a high position from which it cannot easily be displaced—especially since its disposition to rot can be checked. It maintains its place at the head, and more Concords are grown and marketed than any and all other sorts.

Bunch large, shouldered, rather compact; *berries* large, globular, BLACK, thickly covered with a beautiful blue bloom; skin thin, tender, cracks easily; flesh sweet, pulpy, tender; colors about two weeks before the Catawba, but should be allowed to hang late, to develop all its good qualities, none too good at best. Not a good keeper, becoming insipid soon after being gathered. In some localities, however, especially in East Tennessee and parts of Virginia, the Concord becomes so very sweet and rich as scarcely to be recognized. *Roots* numerous, stout, above average hardness in texture, with medium liber, readily pushing new fibers under the attacks of Phylloxera. It was exported as a grafting stock to Southern France, but proving ill suited to some localities in that climate it was soon generally rejected; the *Taylor* and other *Riparia* varieties being much preferred as stocks for grafting. Canes of average thickness, long, rambling, with numerous and well-developed laterals. Wood of medium hardness and pith. *Vines* very strong, rampant growers; coarse, strong foliage, dark green above, rusty beneath; has proved very hardy and healthy, and is immensely productive. This is well illustrated in the following engraving, from a photograph of a Concord grape-vine exhibited at the St. Louis Fair. In many lo-



CONCORD.

calities, however, the Concord is often subject to *rot*. Its beautiful appearance makes it one of the most attractive market grapes; and, although its quality is not first rate, the popular taste has become so used to this variety that it is very much liked, and sells better than superior grapes of less attractive appearance. More vines of this one variety are planted than of all other varieties together. The fruit catalogue of the American Pomological Society says of the *Concord*, "successful over a wider range of soil and climate than any other variety" (in 35 States of this Union); but it is now generally discarded in the SOUTHERN CENTRAL STATES, as it began to rot after bearing a few crops and was found "unsuited to hot climates."

The Concord makes a light red wine, which is effectually becoming the laboring man's drink; can be produced cheap enough, is very palatable, and has a peculiar, refreshing effect upon the system. A white wine may also be made of it by pressing the grapes without mashing them. Specific gravity of *must* varies from about 70° to 80°, according to season, location and soil.

M. Lespiault, in a report on American wines at the Bordeaux Congrès, 1881, says, "the Concord makes a popular wine which in France also has the approbation of the working men. By separating the juice from the residuum (marc) before fermentation, neuter (less foxy) wines can be obtained which resemble some French white wines."

The hardiness, productiveness and popularity of the Concord induced many attempts to raise seedlings therefrom with a view to further improvement and a still wider range of climate (northward). Those which have been named are: (*1. Black Seedlings:*)

ALBERT, by T. Huber.

BLACK HAWK, by Sam Miller. (See descr., p. 93.)

BALSIGER'S CONCORD SEEDLING No. 2 resembles Concord and ripens later.

BUNDY, a Concord seedling raised by the late David Bundy, of Colerain, O., ripening before the Moore's Early: bunches larger, but berries not so large, hanging on the vines until frost.

BURR'S CONCORD SEEDLING, originated with the late John Burr, Leavenworth, Kans.

CAMBRIDGE. (See descr., p. 98.)

CHAUTAUQUA. (See descr. p. 102.)

CHASE BROS.' Seedling. Fruit and vine of the Concord type. No improvement.

CHIDESTER'S Michigan Seedlings.

COTTAGE. (See descr., p. 108.)

DR. WARDER, by Theo. Huber.

EATON'S. (See descr., p. 123.)

EDMESTON: originated in Adrian, Mich.

HERO, a sport of Concord, brought out by Ludwig Hencke, of Collinsville, Ill. Similar to Concord, only much larger in size; one of the *most* showy grapes among the hardy out-door kinds of this class.

HOSFORD, another Michigan Concord seedling.

JENNIE MAY, almost identical with Concord.

JUMBO, by Mr. Rose of Marlboro', N. Y.; larger and earlier; a favorite market grape at New York.

KEYSTONE: originated near Mt. Joy, Lancaster County, Pa.; similar to Concord; preferred by some in quality and especially valuable for excellent keeping qualities; expected by its introducers to take the place of the Concord but their expectations were not fulfilled.

KRAMER'S Seedling, of Minnesota.

LINDEN, by T. B. Miner, of Linden, N. J.: said to be better in quality and keeping longer than the Concord, but smaller in berry and cluster.

The MAIN grape; claimed to be earlier, but proved to be a Concord under another name.

MODENA, raised by the late A. J. Caywood.

MOORE'S EARLY. (See descr., with illustration.)

MCDONALD'S ANN ARBOR, originated with A. McDonald, Ann Arbor, Mich., in 1877. Ripens with Hartford. Vine said to be an extra strong grower, perfectly hardy and healthy. *Bunch* very large, shouldered; *berry* extra large.

NEW HAVEN, by J. Valle of New Haven, Mo. resembling Concord; ripens a week earlier. *Bunch* and *berry* medium, of good quality. Deserves to be better known.

OSAGE, a valuable Concord seedling by John Burr, of Leavenworth, Kans. (See description.)

OSWEGO, another Kansas favorite.

PAXTON, by F. F. Merceron of Catawissa, Penn.; quite similar to Concord.

ROCKLAND FAVORITE, mentioned in Elwanger & Barry's Catalogue; claimed to be earlier and better than its parent, and a splendid bearer.

ROCKWOOD, raised by the originator of the Concord himself; a Concord seedling, said to hold its quality and beauty longer than most other BLACK grapes, but after all not much different from Concord nor earlier than MOORE'S EARLY: P. J. Berckmans considers the *Rockwood* a Vinifera cross, and of very good quality.

STORM KING, originated by E. P. Roe, Cornwall, on the Hudson, New York; a sport of a Concord vine, bearing large, heavy-shouldered *bunches* resembling Concord in every respect, with *berries* nearly twice as large, with but little foxiness.

WORDEN, best Concord seedling. (See descr.)

YOUNG AMERICA, by Samuel Miller of Bluffton; quite resembles Concord.

(B. WHITE SEEDLINGS.)

By these experiments it was found that the *Concord* shows a strong tendency to produce WHITE SEEDLINGS, of which MARTHA was the earliest, and became one of the leading varieties.

ADELINE, ANTOINETTE, AUGUSTA, and many more, produced by T. B. Miner, of New Jersey, from Concord seed. Vines vigorous and hardy, bearing handsome white grapes.

ALPHONSE, a very good grape, by Theo. Huber.

BALSIGER'S No. 32 has hardly any foxiness about it; its *must*, weighing 84°, ripe on the 15th of August in our latitude and hanging freely to the vine in good condition till October.

CAPITAL, raised by W. H. Lightfoot, of Illinois; considered valuable.

EVA and MACEDONIA, both raised by Samuel Miller from Concord seed, were similar to Martha, and abandoned by him.

ESTHER. (See description).

GOLDEN CONCORD, by John Valle of New Haven, Mo.: a poor grower, inferior to Martha.

HAYES, by Jno. B. Moore. (See description.)

LADY, by G. W. Campbell. (See description.)

LEAVENWORTH. (See description.)

MASON'S SEEDLING. (See description.)

F. Muench, F. J. Langendorfer, J. Balsiger, and many others, raised white Concord seedlings.

POCKLINGTON. (See description).

UNA, raised by E. W. Bull; (the originator of the Concord.)

WHITE ANN ARBOR, raised by C. H. Woodruff of Ann Arbor, Mich., in 1870; said to come nearest to the Pocklington in size and to be a very fine white grape, perfectly hardy and earlier than Concord; but it has the fault of dropping from the stem. The committee of the Am. Pomol. Society pronounced it too acid; and the Michigan Experimental Station report, 1894, says: it failed to fruit here (South Haven) planted in 1888.

WHITE CONCORD, produced by the late A. J. Caywood of Poughkeepsie, N. Y.—said, by his son, to have been the parent of *Duchess*, by crossing its seed with *Delaware*.

The most promising new grapes among the WHITE, pure Concord seedlings are:

COLERAIN. (See description, p. 105); also,

WITT, both of Ohio. (See description.)

The only RED grape, claimed to be of pure *Concord* seed; by others, however, to be a cross between *Concord* and *Catawba*, is the WOODRUFF. (See description.)

Great improvements have been achieved by crossing the Concord with other native varieties, among which the NECTAR, called also Black Delaware; the JEFFERSON, a red grape; the NIAGARA, called a *White Concord*, and the DIAMOND, which is put at the head of the list of "all-around" white grapes.

By hybridizing the Concord with European varieties grapes of superior quality were produced, but their hardiness, health and productiveness is generally doubted. See "Hybrids" in Manual; see, also, description of:

"TRIUMPH" and "LADY WASHINGTON," and last, but not least, "CAMPBELL'S EARLY."

Concord Chasselas. A Labr.-Hybrid grown from Concord seed, by Geo. W. Campbell of Delaware, O., who described it as follows:

"*Bunch* rather long, usually shouldered, handsomely compact without being crowded; *berries* large, round; skin very thin but tenacious and semi-transparent; seeds few and very small; color, when fully ripe, a rich AMBER with a thin white bloom, almost identical in appearance with the foreign Golden Chasselas; flesh perfectly tender and melting, just enough vinous acid to prevent cloying the most delicate palate; wholly free from any vestige of foxiness, and a grape that will satisfy the most fastidious taste formed upon the foreign standard. Ripens same time as the Concord. The vine is vigorous in growth; large foliage, thick and abundant, resisting mildew in fully exposed locations as well as the Concord."

Concord Muscat. (*Labr.-Hybr.*) Also grown from Concord seed, by Geo. W. Campbell of Delaware, O., who gave the following description of it:

"*Bunch* long, moderately compact, sometimes shouldered; *berries* very large, oval; skin thin, rather opaque; seeds few and small; color, light GREENISH-WHITE with delicate bloom; flesh tender and melting, with no pulp or astringency next to the seeds; flavor rich, sugary, slightly sub-acid, with the peculiar high flavor which is the distinguishing charm and excellence of the foreign Muscats and Frontignans. There are really few grapes among the most admired foreign kinds which equal this variety in pure flavor and high quality. Vine vigorous; foliage large and moderately thick; resists mildew, except in very unfavorable seasons. In this respect it is better than Eumelan, Delaware or Rogers' Hybrids, but not equal to Concord."

Concordia. (*Est.-Hybr.*) Originated by Dr. J. Stayman of Leavenw., Kan., from Delaware (?). (See Delaware, remarks on its seedlings by Burr and Dr. Stayman). *Vine* vigorous, hardy, healthy and productive. Bunch large, compact; berry large, BLACK, tender, juicy, sprightly sweet, rich vinous sweet; quality very good, ripe about with Concord, but of better quality and has shown neither rot, nor mildew.

Conqueror. (*Labr.-Hybr.*) A seedling raised by Rev. Archer Moore, New Jersey, and by him supposed to be a cross between Concord and Royal Muscadine. Very early; *bunches* long, loose, shouldered; *berries* medium, glossy BLACK with a bloom; flesh slightly pulpy, juicy, sweet. Vine a free grower, hardy, healthy and prolific. With us the Conqueror is doing remarkably well, proves less subject to rot than other hybrids; nor can we see any trace of foreign blood in either foliage, growth or appearance; it seems to be rather a cross between Concord and some Riparia variety, and worthy of more extended cultivation in some localities.

Constantia. (*Labr.*) See Alexander.

Cornucopia. (*Rip.-Hybr.*); Arnold's No. 2. A seedling of Clinton, crossed with Black St. Peters. Vine much resembling the Clinton in appearance, but superior in size of berry and bunch, and greatly superior in flavor; a healthy grape and a good bearer. The Paris (Canada) Horticultural Society reported on it as follows:

"This is undoubtedly one of the best grapes in the whole collection of Arnold's hybrid grapes—a very promising grape." *Bunch* large, shouldered, very compact; *berry* above medium size, BLACK with a beautiful bloom, flavor excellent, very sprightly and pleasant; skin thin, seeds large, bearing nearly the same proportion to size of berry as in Clinton: flesh melting, with very little, if any, pulp—seems to burst in the mouth; all juice, with a little acid and astringency. Ripens with Concord. A good market grape and "a good keeper"; also valuable for wine.

Corporal. (*Hybr.*) A cross between Eumelan and Worden, originated by D. S. Marwin, Watertown, N. Y. *Bunch* and *berry* medium; loose; color BLACK; a showy, good grape. (Amer. Pomol. Society, Report on New Fruits, 1881). It resembles *Worden* so much that it sells for that variety and is considered by some (?) as better even in quality. In northern New York, its native home, it is an abundant fruiter and is an excellent shipper, carrying well to market, but where the vine mildews, to which it is inclined in places where this disease prevails, it is of little value. Though this may now be obviated, varieties less sensitive to downy mildew will still be preferred.

Cortland. (*Labr.*) A seedling of Concord crossed with Hartford, originated by M. F. Cleary, of Cortland, N. Y. and said to be a *very* early, but also very inferior grape. At South Haven, Mich. it produced (1893) a beautiful crop; even earlier than Moore; the report 1894 of the Experiment Station describes it as large, BLACK, quality blank. We suspicion that it is the same or identical with the next following Courtland.

CORNUCOPIA.

Cottage. (*Labr.*) A seedling of the Concord, raised by E. W. Bull, the originator of that variety. A strong, vigorous grower, with remarkably large and leathery leaves, and abundant strong, branching roots; *bunch* and *berries* about the size of Concord, but of a somewhat darker shade; color BLACK with heavy bloom; flesh pinkish, flavor very pleasant, sub-acid when pulp is broken; skin thick with large seeds; ripens before Concord; quality better than the parent, with less of the foxiness peculiar to the other, but also less suited to some soils and localities than the Concord. In the Bushberg vineyards it is giving better satisfaction than *most* other Labrusca varieties while in some other localities it is not as strong a grower nor as heavy a bearer as Concord, and in some places even does poorly, ripening unevenly, with many green and

reddish berries, bees destroying the ripe black berries; but these mixed grapes of the Cottage make the best jelly.

Mr. Bull in his successful efforts to improve our native grapes, began by sowing the seeds of a wild grape (V. Labrusca), from which he raised seedlings. He then sowed the seed raised from these and obtained others, among which was the Concord. He then raised 2,000 seedlings before he got any that surpassed the Concord. In the fourth generation, or grandchildren of the Concord, he obtained seedlings supposed to be superior to the Concord and nearly equal to the European grape (V. Vinifera).—*U. S. Agr. Report for* 1867.

Mr. Bull's experimental garden is a sandy hillside, soil poor in organic matter but rich in iron. He uses no rich manures; his vines get a little ashes and bonedust, and good culture. Mr. Bull has not succeeded in raising another seedling which would be superior to the Concord. But to have raised *this one* is sufficient cause for satisfaction; and it is so much more to the credit of Mr. Bull that he continued his efforts, as they were never rewarded by any pecuniary profits.

Courtland. (*Labr.*) Introduced by E. C. Pierson, Waterloo, N. Y., described in *Mitzky's* "Our Native grape" clusters fair size, compact; berries medium large, BLACK, sweet; good (!?) quality; vigorous, hardy, healthy; about two weeks before Concord.—P. J. Berckmans however says: This variety was received from Canada: BLUE-BLACK, skin tough, acid, very foxy, inferior, resembles Champion.

Cowan, or McGowan. (*Rip.*) *Bunch* and *berry* medium; BLACK; rather harsh and austere. Not desirable.—*Downing.*

Creveling. (*Labr.-Hybr.*) Syn.: CATAWISSA, BLOOM. Columbia County, Pennsylvania. Vine a fair grower, healthy and hardy, but inclined to anthracnose, rot and mildew; may be planted 6 by 6 feet apart, on northern and northeastern hill-sides. *Bunches* long, loose on young vines, but on old ones sometimes as compact as Concords; at other times very loose, by imperfectly setting its fruit. *Berries* medium to large, slightly oval, BLACK with blue bloom; flesh tender, juicy and sweet; quality *best.* Ripens early, a few days later than Hartford, and before Concord. *Roots* thick and warty, and comparatively few; texture soft, with a thick liber, forming young fibers rather slowly; canes long and rambling, slender, long-jointed, and with few laterals; wood soft, of a reddish color, with a large pith.

In all these characteristics there is scarce a trace of the Æstivalis, for which class some would claim the Creveling. Some botanists consider it a hybrid with Vinifera.

This grape, for a time, was rapidly growing in favor; this it has not deserved, as it is often unproductive, setting its fruit imperfectly.

We found it unsatisfactory as a market grape; it would still be more unprofitable as a wine grape, and can only maintain its place as a fine family grape for garden culture. Rev. Burnet, of Ontario, who has planted and cultivated the *Creveling* intermingled with the *Concord*, says that he found it "everything that could be desired, both in regard to the bunch and the berry"—ascribing it to impregnation by the Concord.

THE CROTON GRAPE.

Critic. (*Labr.*) A seedling from Jefferson, originated by J. S. Bruce, Fayetteville, N. C. Vine only moderately vigorous, but healthy; foliage nearly similar to Delaware, but coarser and larger. *Bunch* fairly good size; color of a fully ripe Delaware; clings firmly to the stem, remaining plump and sound for a long time; quality mildly agreeable, not vinous but rich; pulp melting; ripens with Delaware. (*After Mitzky "Our Native Grape."* Though Mitzky copied largely from our catalogue *without* giving credit; we do when we copy from his!)

Croton. (*Æst.-Hybr.*) Hybrid cross between Delaware and Chasselas de Fontainbleau, originated by S. W. Underhill, of Croton Point, N. Y.; bore its first fruit in 1865. In 1868 and following years it obtained prizes at the New York, Pennsylvania and Massachusetts Horticultural Societies and other grape exhibitions, attracting marked attention. The late H. E. Hooker, of New York, said: "The Croton succeeds very well indeed in *some* localities, and it is certainly one of the most

THE CUNNINGHAM GRAPE.

delightful grapes, when well grown, that I have ever raised."

Bunch often 8 to 9 inches long, moderately compact, and shouldered; the shoulder often nearly as large as the bunch, and the clusters frequently winged; *berries* of medium size, of light yellowish-GREEN color, translucent, and remarkably delicate in appearance; flesh melting and sweet throughout; quality *best*, with too much of the character of the Chasselas. Ripens early. Some very prominent pomologists say that it is one of the best hardy grapes they have tasted, and report the vine vigorous and productive; others, that it does not succeed at all;—even grafted on strong roots, it remained unproductive and worthless with Western growers. Our own experience has been very unfavorable, as the vine is tender, a weak grower, with a tendency to mildew and rot. We cannot recommend it except as an amateur fruit, one of the most beautiful in appearance and exquisite in flavor.

Cunningham. (*Æst.*) Syn., LONG. A southern grape, of the *Herbemont* class; it originated in the garden of Jacob Cunningham, Prince Edward Co., Va. Dr. D. N.

Norton, the same who introduced to notice our invaluable Norton's Virginia grape, made wine from the Cunningham in 1855, and furnished to the Elder Prince, of Flushing, Long Island, the stock from which this grape has been disseminated. In *this latitude* and FARTHER SOUTH, the Cunningham is VERY *valuable* for southern slopes with poor, light limestone soils. Transplanted to southern France, it was there considered as one of the most valuable American grapes, the quality of which was admitted to be equal to that of some of their own favorite varieties.

Bunch very compact and heavy, medium, long, not always shouldered; *berries* small, purple-brownish BLACK, juicy, and vinous. Vine a very strong grower, HEALTHY, and productive; to be so, however, it needs spur-pruning on laterals, and light winter protection. It should be planted only in favorable locations, where the *Herbemont* succeeds best. *Roots* of medium thickness, inclined to be wiry, straight, tough, with a smooth, hard liber. The Cunningham is one of the *best* resistants to the Phylloxera. Canes not numerous, but very stout and vigourous, often attaining a length of 30 or 40 feet in one season; wood hard with a medium sized pith, and a hard, thick outer bark adhering closely even on the ripe wood, a characteristic common to all the Æstivalis class. Ripens its fruit very *late*, and makes one of the most aromatic and delightful wines, of dark yellow color. *Must* 95° to 112°.

Cuyahoga. (*Labr.*) Syn., WEMPLE. A chance seedling found and grown by——Wemple, of Collamer, Cuyahoga Co., Ohio. Vine a strong grower; requires a *warm*, sandy soil, and exposure to make it desirable at the north; but when well grown it is of fine quality. South it casts its foliage and is not valuable. *Bunch* medium, compact; *berry* medium, dull GREENISH-AMBER when fully ripe; flesh tender, juicy, rich, vinous, sweet. Ripens with the Catawba or a little later.

Cynthiana. (*Æst.*) Syn.: RED RIVER, ARKANSAS. Received by Husmann, in 1858, from William R. Prince, Flushing, Long Island, N. Y. Origin, Arkansas, where it was probably found growing wild. It is a true Æstivalis in all its habits, and resembles Norton's Virginia so closely that it is impossible to distinguish the wood or leaf, although the bunch is perhaps somewhat more shouldered, the berry more juicy and the season for its ripening somewhat earlier. This difference, however, and other points hereinafter mentioned, are attributed by many viticulturists to difference of location, soil, and aspect, and are not deemed sufficient to justify its being considered a separate and distinct variety from Norton's Virginia. We are not prepared to decide, but are inclined to side with those who consider the *Cynthiana* different from and superior to *Norton's*.

Bunch of medium size, moderately compact, shouldered; *berry* below medium, round, BLACK with blue bloom, sweet, spicy, moderately juicy. Juice dark red; weighs very heavy on the must scale, even higher than Norton's Virginia, and, so far, makes *our best red wine*. It has as much body as Norton's, is of exquisite flavor, and can safely enter the lists with Burgundy wines. The Norton's, however, seems to possess medicinal ingredients (tannin) in a higher degree. Vine vigorous and healthy, free from rot, productive, and as sure *here* in its crops of well ripened fruit as any variety we know, but very difficult to propagate, as its wood is very hard, with a small pith and closely adhering outer bark. The fruit ripens some few days earlier than Norton's. Specific gravity of *must* from 98° to 112°, according to the season. For the Central and South Central States we can confidently recommend the *true* Cynthiana as *the best grape for red wine* which we have tried. Cynthiana and Norton are also marvelously adapted to Florida, owing probably to the high degree of moisture in her atmosphere; these grapes attain there a larger size of bunch and berry than any where else; they make there a very fine Claret and Port.

Our Cynthiana wine was awarded the First Medal of Merit at the World-Exposition, Vienna, 1873, and is gaining the "blue ribbon" at every test. The commission at the Congres de Montpellier, France, 1874, reported: "Cynthiana of Mr. Bush, a red wine of fine color, rich in body and alcohol, reminding us of old Roussillon wine." The late papa Muench wrote us: "Too much cannot be said in praise of the Cynthiana; its wine, two or three years old, cannot be excelled by the best red wines of the old world." We look upon it as our BEST AND MOST VALUABLE grape for red wine, and have bestowed special attention on its propagation.

Daisy. (*Labr.-Vin.*) A seedling of Goethe, said to have been raised by Dr. J. Stayman. Bunch medium size, rather loose. Berry resembling Isabella in shape, dark RED with lilac bloom; pulp tender, sweet, pleasant flavored, vinous, slightly astringent; skin thin, seeds few; ripens about with Worden. (All this so unlike Goethe that we doubt this to be its parent.)

Dana. (*Labr.*) A seedling grown by the late Francis Dana, of Roxbury, Mass., and described in the "Massachusetts Horticultural Transactions." *Bunch* medium, shouldered, compact, with a peculiar red stem; *berries* rather large, round, RED with a rich, heavy bloom, so that when fully ripe they appear almost black; flesh as free from pulp as Delaware; not so sweet, yet not an acid grape.

John B. Moore & Son, Concord, Mass., say of this grape, that the vine is a strong grower and perfectly hardy, the foliage clean (?) and healthy. *Bunch* as large as the Concord at its best; similar to the Red Chasselas in quality and color, and supposed to be a *pure native*. Ripens with Concord.

THE CYNTHIANA GRAPE. (See page 111.)

Daphne. (*Labr.-Hybr.*) Copley's hybrid from seed of Telegraph (Labr.) with pollen of W. Frontignan. The vine is a very strong grower, hardy, healthy and productive. *Wood* dark brown; joints 4 to 6 inches on canes; *leaves* three-lobed, some round, very coarsely notched on the edge, dark dull green, lighter on the under side. *Bunch* and *berry* full medium to large, seldom shoulders; color WHITE; skin rather thick, yet transparent; no pulp; flesh sweet and rich, Muscat flavor without a trace of foxiness: the bunch has an unusually long stem; it ripens early, but will keep in good condition until frost. Reported at New Jersey State Fair (1888) a handsome white grape of very good quality; awarded a special premium.

Darwin. (*Æst.*×) A seedling of Delaware crossed with some vigorous Æstivalis by Dr. J. STAYMAN, who, when he first exhibited some of its fruit, called it *Eureka*; but finding that there is an old Isabella seedling long known under this name, he wisely changed it, before being disseminated, to the name of the great evolutionist; this grape being a marked example of his theory. The vine of this one is vigorous, hardy, healthy and productive; its foliage is strongly of the Æstivalis type. *Bunch* large, double shouldered, compact, handsome: *berry* RED, medium in size, tender, juicy, vinous, sweet; quality best: ripens with Delaware, Our friend Sam Miller pronounces it one of the *very best.*

Delaware. Origin unknown. It was found many years since (about 1850) in the garden of Paul H. Provost, Frenchtown, Hunterdon County, N. J., who had immigrated from Switzerland, and brought with him many varieties of foreign grapes, which he cultivated in his garden. It was first known as the "Italian Wine Grape," then it was supposed to be the "Red Traminer," or a seedling from this variety. We have reasons to believe it an accidental hybrid, a natural cross between the *Vitis Æst., Labr.* and *V. Vinifera. Munson* considers it a hybrid of Bourquiniana and Labrusca, thus coming to about the same conclusion as we did more than 20 years before we knew of his classification. He thinks that: "Anyone who has ever seen Delaware growing alongside of Herbemont in vineyard cannot fail to recognize an element very much like Herbemont in foliage and fruit, but intermingled with Labrusca." We find, however, that it differs materially in this that the Delaware is very hard, resisting severest cold while the Herbemont is very tender; and the latter is a most vigorous, rapid grower, which the Delaware is not.

DELAWARE.

This variety, first brought to notice (about 1855) by A. Thompson, Delaware, O., is considered to be one of the best, if not *the best*, of all American grapes. Its introduction and dissemination, some ten years later, made a deeper impression upon American grape-growers, says Geo. W. Campbell, this noble veteran viticulturist, than that of any other variety which preceded it. The real origin of the Delaware is still a matter of conjecture; and, notwithstanding its small size, rather slow growth and delicate foliage, in many places disposed to mildew, its early ripening, great beauty and unrivaled excellence placed it immediately at the front, and gave an impulse and impetus to grape culture, before unknown. The advent of this little grape may truly be said to have inaugurated a new era in grape-growing in this country, and the interest which it awakened has never ceased, though decades of years have passed and hundreds of competitors have striven to dethrone it from its high position as *the standard of excellence* among our native grapes. It seems ENTIRELY FREE FROM ROT in all seasons, and its perfect hardiness and unsurpassed quality and popularity, both as a table fruit and for wine, places this variety at the head of American grapes. Unfortunately and from various causes, it does not succeed well in many localities; it should be planted in deep, rich soil, open and well-drained, *here* on northeast and eastern slopes, and requires good cultivation, thinning the crop, and pruning to short laterals. Its *roots* are slender, and not inclined to branch out much; of medium toughness, with a rather soft liber. Canes proportionate in length and thickness, with an average number of laterals; wood hard, with a small pith. It is a slow grower. Fourteen hundred and fifty vines may well be planted to the acre, 5 to 6 feet being a sufficient distance. The

Delaware is exceedingly hardy, enduring uninjured the severest winters, if the vines are healthy. In many localities it yields a sure and abundant crop, and is entirely without a rival for the production of a fine white wine. It is considered "altogether the best grape we have." In some localities, however, it has been found subject to mildew or leaf-blight. and this tendency is greatly aggravated by allowing the vines to overbear, which the Delaware, if permitted, is sure to do. Good authorities recommend a slight coping over the vines as a protection against mildew, and the use of the preventives recently discovered proved effectual. Its root was supposed to be sensitive to Phylloxera, and its leaves are often covered with galls produced by this insect; but Reich of Armeillére, the eminent grape-grower of the Rhone-Delta, has furnished proof that this variety also is successfully resisting the attacks of Phylloxera. He artificially infected them with the insect, three times each year, without doing them any harm.

Bunch small to medium, compact; clusters usually shouldered; *berries* below medium, round; skin thin, but tenacious; pulp sweet and tender; juice abundant, rich, vinous and sugary, sprightly and refreshing; color a beautiful light red, covered with a thin whitish bloom and very translucent. It is without harshness or acidity in its pulp, exceedingly sweet, but sprightly, vinous and aromatic. *Ripens* early, about eight days later than Hartford. Quality best, for the table as well as for wine; *must* 100°–118°; acid 5 to 6 per mill.

When the former editions of this catalogue were published, *seedlings* from Delaware and its crosses with other varieties were but little known, though innumerable attempts had been made to raise them. Expectations to produce therefrom a grape of superior value, larger only in size of bunch and berries, yet of the quality of the Delaware, seemed doomed to disappointment; until John Burr and Dr. Stayman seem to have struck the keynote to success,* and produced a large number of remarkable. valuable varieties which are hardy, healthy, vigorous and of high quality; few of the many hundreds of Delaware seedlings have ever shown marked features of the Vinifera; many of its seedlings showed more or less of the "*Fox grape.*" This fact and other characteristics lead us to place its origin, *in part*, from this species, although some eminent horticulturists and botanists class the Delaware with *Æstivalis* (others with Riparia). It is true that the Delaware leaf is more closely allied to Æstivalis; its wood is harder, more difficult to propagate, and the tendrils are not continuous (nor are they regularly intermittent); but we find a remarkable parallel case in "*Sheppard's Delaware*," raised from seed of Catawba by J. N. Sheppard in 1852. From him *Charles Downing* received it, with its history, and says, "*the vine and fruit are similar in all respects to Delaware.*"

In Minnesota, S. D. Hillman, chairman State fruit committee, reports that the Delaware grows there larger than that shipped from eastern vineyards and, since the downy mildew has been checked, seems improved in size, color and flavor.

A combination of Delaware and Concord, by G. W. Campbell, produced a vine with fine growth and healthy foliage; clusters large with the form and color of the Delaware, flavor rich and delicate; ripening early and berries hanging firmly to the stems; but it had many and too large seeds for the size of the grape; . . . and, relating some of the trials and disappointments he met with in endeavoring to produce new varieties of merit by crossing Delaware and Concord, he told us: "This nursling of years, from which I had at one time great hopes, is relegated to that banishment where hundreds have gone before."

Black Delaware or Nectar, (see their descriptions), claimed to be Delaware Seedlings, are most probably hybrids between this and another variety (Concord); so also Kalista and Saccharissa, claimed to be White Delaware Seedlings, produced by J. Sacksteder of Louisville, Ky.

Delawba. (*Labr.* ×) Originated by Dr. L. C. Chisholm of Spring Hill, Tenn. A seedling of Delaware and Catawba, combining in the name the words Delaware and Catawba; reported as one of the promising novelties, in 1891, by H. E. Van Deman, Washington, D. C. *Cluster* moderately compact, cylindrical, tapering slightly, sometimes slightly shouldered; ripens immediately after Delaware; color, light amber, with light lilac bloom; skin quite tough. A new grape certainly worthy of trial. In growth and foliage it is almost identical with Catawba, but much more robust and resistant to diseases. Its berries are not uniform in size, ranging from a medium Catawba to a small Delaware, yet ripens every berry at the same time. Not at all attractive, its claim must be based on vigor, quality and *great productiveness*—especially for *wine* of very good quality and fine flavor.

Will be disseminated in 1895.—B. & S. & M.

* Namely that the Delaware, a weak grower, is congenial and easily impressed by a stronger variety, but very strong and positive varieties very seldom, if ever, by very weak varieties.—
Dr. Stayman, on the production of new Seedling Grapes.

DELAWBA.

Prof. Lamson Scribner, Director of the Experiment Station, University of Tennessee, wrote Sept. 2d, 1890: "Delawba is a remarkably good grape, possessing a sweet, delicate flavor, and if its 'thrifty growth and free bearing habit' is maintained in other localities it will be a valuable acquisition to our vineyards."

W. A. Taylor, Acting Pomologist of the U. S. Dept. of Agr. at Washington, D. C., wrote in August, 1891: The specimens of Delawba, which you say you are ashamed to send, certainly confirm my opinion formed when the previous lot was received. I think this a most excellent grape, unless it has some weak point that I have not studied.

The illustration, showing two average medium bunches photographed from a DELAWBA vine loaded with near one hundred clusters in August, 1894, after a season of excessive drouth, shows that its "free bearing habit" is fully maintained; and we believe that it will be *the most desirable white-wine grape* since the introduction of the *Elvira* (in 1874),—better in quality, ships well, keeps well, does not crack; combining in fact as well as in name qualites of the DELAWARE and CATAWBA, without being inclined to the diseases of either.

D'Elboux. (*Labr.-Hybr.*) Produced by C. S. COPLEY, of Stapleton, Staten Island, N. Y., from seed of Telegraph (Labr.) fertilized with Wilmot's Hamburg (Vin.) Vine a strong, rampant grower, with short-jointed canes; very hardy and productive. Foliage large, slightly three-lobed, dull green on both sides, the under side being smooth and not downy, otherwise it would be taken for pure Labrusca leaf; it seems not liable to either rot or mildew. *Bunch* and *berries very* large, BLACK, oval or hammered like its male parent, skin thick, never cracks; sets its fruit evenly and well; no thinning is required, yet the bunch is compact and very showy. Ripens with Hartford; it colors before and will hang until frost; its flavor is rich, pure and sweet, something between the taste of Isabella and Hamburg; makes a brilliant, dark, ruby red wine of good body, rich flavor and bouquet or aroma. It has taken a large number of medals, certificates of merit, diplomas and money prizes, at the fairs, as very promising for market, wine and table; but this, the most valuable of Copley's hybrids, has not yet been disseminated.

Dempsey's Seedlings. See BURNET, p. 96.

Detroit. (*Labr.*) This variety is supposed to be a seedling of Catawba. It was found in a garden in Detroit, Mich. We copy from a description in the Horticulturist: "Vine very vigorous and hardy; foliage resembling Catawba; wood short-jointed; *bunches* large, compact; *berries* very dark rich brown CLARET with a light bloom, round and regular; flesh with very little pulp, rich and sugary. Ripens earlier than the Catawba."

Devereux. (*Æst.*) Syn., Black July, Lincoln,? Blue Grape, Sherry, Thurmond, Hart, Tuley, McLean, Husson (Lenoir, incorrectly: the name Black July is also objectionable, being used by English ampelographs for the Ischia noir, or Noir de Juillet, a Pineau variety—*Vinifera*—with which the Devereux has no resemblance.) A southern grape; belongs to the same class as Herbemont and Cunningham. The great French botanist, M. Milardet, classifies it as a Hybrid of Æstivalis, Cinerea and Vinifera. In France it is considered one of the best American Vines; its wine resembling some of their own wines, "bon de gout:" but producing very little in quantity, comparatively. Where this variety will succeed it is one of our best wine grapes, producing a white wine of exquisite flavor. It is somewhat subject to mildew, very tender, and requires covering in the winter. North of Missouri it should not be tried, but here it succeeds admirably on southern slopes, fertile soil, in favorable seasons; never on wet, cold soils. Our southern grape-growers especially should plant some of it. *Bunch* long, loose, slightly shouldered; *berry* black, below medium, round; skin fine, tender: flesh meaty, juicy, without pulp, and vinous; quality best. Vine a strong grower, and, when free from mildew, moderately productive; wood long-jointed, purplish-brown at first, of deeper purplish-red when ripe; with bi-forked, intermittent tendrils—these, as also the leaf-stalk, are tinged on their base with a purplish-brown hue, like the young canes; the buds are covered with a russet down, unfolding with that rosy complexion peculiar to the young downy leaves of most Æstivalis. The developed foliage is of medium size, entire (not lobed), considerably wrinkled, turgid, with somewhat abundant hair-tufts on the lower veins.

DIANA.

Diamond. (*Labr.*×) See Moore's Diamond.

Diana. (*Labr.*) A seedling of Catawba, raised by Mrs. Diana Crehore, Milton, Mass.: first exhibited in 1843, before the Massachusetts Horticultural Society. A. S. Fuller, the celebrated Horticulturist, justly remarks:

"There is probably no one variety of grape in cultivation in regard to which there is a greater diversity of opinion, and its variableness fully warrants all that is said about it. In one section it is really excellent, while in others, perhaps near by it, it is worthless. This difference is often observable in the same garden, and from no apparent cause."

The Diana seems to do best in warm, rather dry and poor soil; gravelly clay or sandy loam seems best suited to its wants. Is reported to do remarkably well in Georgia. *Bunches* medium, very compact, occasionally shouldered; *berries* medium size, round, pale red, covered with a thin lilac bloom; flesh tender, with some pulp, sweet, juicy, with a musk flavor that is very strong until the fruit is fully ripe, and then often offensive to some tastes. Colors its fruit early, but does not really mature much earlier than the Catawba. Vine a vigorous grower, requiring much room and long pruning, and increases in pro-

ductiveness and good quality as the vines get age; *roots* few, but long and thick, soft in texture, and with a thick liber; canes heavy and long, with few laterals, and a very large pith. It is not as productive, not quite as large in bunch and berry, as its parent, but some think it superior in quality; unfortunately it is just as frequently suffering from mildew and rot as the Catawba. Its berries hold well, and its thick skin enables it to withstand changes of temperature better; hence the Diana improves by being left upon the vine until after pretty severe frost. As a variety for packing and keeping, it has no superior. It is valuable also for wine. *Must* 88°–90°; acid 12.

Diana Hamburg. (*Labr.-Hybr.*) Said to be a cross between the Diana and Black Hamburg, originated by Jacob Moore, at Rochester, N. Y.; *bunches* generally large, sufficiently compact, well shouldered; *berries* above medium, slightly oval, of a rich fiery-RED color when fully ripe; flesh tender, of very sweet flavor, equal to some of the finer foreign sorts. Vine a weak grower, with short-jointed, firm wood, very tender; leaves of medium size, crimped, and sometimes rolled in; subject to mildew. Its fruit ripens after the Concord, but before its parent the Diana. We may as well state that at least three independent parties are reputed to have made this hybrid, and several crosses of the foreign Black Hamburg on the Diana may exist. Ours is from J. Charlton, Rochester, N. Y., but we might as well attempt to grow the Black Hamburg in open air. Its propagation for the Mississippi Valley should be given up—at least we have done so.

Dr. Collier. (*Linc.* ×) Syn.: Big Red. One of T. V. Munson's remarkable grapes, a seedling of Post-Oak crossed with Concord. He sent it to the New York Experiment Station, Dr. Collier director, in the fall of 1892; vine hardy, vigorous and productive; leaves out and flowers late, *bunch* large, cylindrical; *berry* large, DARK RED, becoming purple; skin thin and tough, does not crack, pulp juicy, tender, with red juice; good Concord flavor and quite good quality, hangs on long after ripening without loosing flavor. Ripens just after Concord.

Dr. Warder. (*Labr.*) Originated by Theophile Huber, Illinois City, Ills., of unknown parentage. Vine a vigorous grower, healthy, hardy and an immense bearer on his place. *Bunch* very large, *berries* same size as Concord, claimed to be sweeter than Concord and to ripen a few days earlier; named in honor of the late Dr. John A. Warder, of Ohio, and figured in the Rural New York of 1886, but not disseminated.

Dr. Wylie. One of the late Dr. Wylie's Hybrids (q. v.) which he sent from South Carolina to our old friend Samuel Miller, without a name, probably a cross between Halifax and Delaware. The vine is a healthy, strong grower and productive; *bunch* and *berry* nearly double the size of Delaware and fully equal to it in quality. It never had a rotten berry, though surrounded by different other varieties that all rotted at same time. Most worthy of trial and dissemination in Missouri and South.

Don Juan. (*Labr.-Hybr.*) One of Ricketts' seedlings, much like its parent *Iona*. F. R. Elliott says: It is better than any known hardy grape of its color; is about the size, in berry, of Rogers' 15, a deeper color, and a larger and better bunch; the flesh is vinous, sweet and sparkling. (See "Ricketts' Seedlings.")

Downing; (*Est.-Hybr.*) or Charles Downing. A Hybrid obtained by James H. Ricketts, Newburgh, N. Y., from the Croton, fertilized by Black Hamburg. "*Bunches* large, sometimes shouldered: *berries* large, slightly oval, nearly BLACK with light bloom; flesh tender, breaking somewhat like the foreign sorts; in flavor it is first rate, being sweet, with just enough sprightliness to prevent cloying the palate."—*Fuller.*

The vine is a vigorous grower, with healthy foliage. According to other reports, it was produced from Israella crossed with Muscat-Hamburg. It has an unusually long bunch and large, oblong berries—a remarkable grape. Much esteemed as a fine table grape, but it must have favorable location and not be allowed to overbear. "This is the largest bunch and berry of any outdoor grape I have met with," says Samuel Miller. Specimens received in 1884 from J. G. Burrow, Fishkill, N. Y., were very large and fine —but it is now discarded by him. Mr. Ricketts must have valued it highly, else he would not have given it the name of our revered great Pomologist.

Dracut Amber. (*Labr.*) Syn.. EARLY AMBER. Originated by J. W. Manning, Dracut, Mass. Vine very vigorous, healthy and hardy. Regarded by us as but a slightly improved wild Fox grape; very early and productive. *Bunch* large and long, compact, often shouldered; *berries* large, round; skin thick, of pale RED color; pulpy and foxy; too foxy for our taste, and should be discarded, when so many better varieties can be grown. (See Lutie, Wyoming and Woodruff Red.) In Massachusetts it is still considered as the one best extra early grape, after the hundred and one other varieties have been tried. It is considered worthy of cultivation North, for family use only.

Dufour. Syn.. Jaeger's No. 56. A seedling raised by Hermann Jaeger, of Neosho, Mo., from his selected Post-Oak grape (No. 43) fertilized with pollen of Æstivalis; same as produced his "Longworth" grape, (q. v.) It resembles Herbemont in quality and size of bunch and berries, but is of Catawba color; starts growing later and is thereby less exposed to late frosts, fatal to other varieties. Ripening very late, about two weeks after Norton's and keeping easily till late in December. May require winter protection even in South Missouri. (See figure, p. 26.)

Duchess. (*Labr.-Hybr.*) A fine WHITE table grape, raised near Newburgh, N. Y., by the late A. J. Caywood, who stated that "it was produced by crossing a WHITE CONCORD seedling with DELAWARE or WALTER, the pollen of both being applied at the same time." The *vine* is a vigorous grower, with moderately short-jointed shoots; *leaves* large, light green, rather thick, coarsely serrated, adhere to the vine very late in the season; vine productive. *Bunch* medium, shouldered, occasionally double-shouldered, compact; *berries* medium, usually one-third *less* in size than on the illustration, roundish; skin rather thick, light green at first, but pale GREENISH-YELLOW when mature, sometimes a golden yellow where fully exposed and gathered late, and covered with a thin whitish bloom, almost transparent, dotted with diminutive black spots; *flesh* tender, free from pulp, juicy, sweet, spicy, rich, and of excellent quality; the berries adhere strongly to the peduncle, and the fruit keeps a long time after being gathered. Ripens soon after the Concord.

"DUCHESS."

John J. Thomas, recognized as authority among pomologists, says: In quality, it is unquestionably one of the most delicious of all out-door varieties, and in growth the vines possess great vigor and hardiness, withstanding our winters uninjured. In a discussion on the new grape at the Am. Pomol. Society meeting, 1881, Mr. Caywood remarked "that the Duchess will not endure high feed. It grows rampantly, making thirty feet on the vines at three years old." He assured us also, that: "It carries better than any other known variety, having been sent to California and back again in good condition, and five weeks afterward the same clusters were sent to the exhibition at Atlanta, Ga. It keeps without difficulty until spring. All grapes that carry well keep well from the same general cause." Testimony as to the excellence of the Duchess grape has been received from many eminent authorities in the country, which our own experience corroborates. The vine fails, however, in many locations; in our locality it is a fine garden variety for amateurs and for family use. It was shown, in fine condition by Ellwanger & Barry, of Rochester, on January 28, 1892, at the New York Horticultural Society meeting!

Dunlap. One of Ricketts' Hybrids; a fine RED grape. See Ricketts' Hybrids.

Dunn. (*Est.*) A very late grape obtained from a Mr. Dunn, in Western Texas, and named after him by G. Onderdonk, Mission Valley, Texas. *Vine* a vigorous grower, in habit and foliage precisely like the *Herbemont*, but *bunches* generally not shouldered, and *berries* above Herbemont in size and paler in color; ripens about when the Herbemont is gone, which is a valuable feature for Southern Texas and similar southern climates, but makes it unfit for our Northern and even for the Central States.

Further experiments make it doubtful whether this variety is sufficiently distinct from the Herbemont, and whether the difference in size and time of ripening may not have been due to other circumstances, conditions of soil, etc.

Early Amber. (*Labr.*) See Dracut Amber, page 117.

Early August. (*Labr.*) Said to be a twin seedling of Pocklington, from Concord, introduced or raised by John Charlton, of Rochester, N. Y. Vine vigorous, hardy and prolific, with Concord foliage; clusters medium to large, moderately compact, and sometimes shouldered; *berry* above medium, golden YELLOW with delicate white bloom, skin thin but tough; sweet with slightly acid flavor, without pulp or foxy taste: claimed to ripen before Moore's Early. Little known.

Early Daisy. (*Labr.*) A chance seedling that came up in the garden of John Kready, Mount Joy, Lancaster County, Pa. Vine a strong grower, very hardy and a regular productive bearer; leaf resembling Hartford, keeps green and fresh till late in the season; *bunches* medium, very compact; *berries* BLACK with blue tint; medium, round, very attractive; skin tough, quality good. Ripens eight days earlier than Champion, and is claimed to be the earliest black grape; believed to do well without much care in any kind of soil.

Early Dawn. (*Labr.-Hybr.*) A black grape of fine quality which originated with Dr. Wm. A. M. Culbert, of Newburgh, N. Y., being a cross of Muscat-Hamburg and Israella; vine healthy, vigorous and productive; wood moderately short-jointed; leaves large, thick and firm, roundish, broadly but not deeply serrated, sometimes slightly lobed. *Bunch* medium to large, long, shouldered; *berry* medium, round, BLACK with a thick blue bloom; skin thin but firm; flesh tender, juicy, sweet, slightly vinous, rich and of very good quality; the fruit adheres well to the peduncle, keeps well, and is a valuable addition to the *early* grapes; either for the table or market. Ripens a week or more before the Hartford.—*Charles Downing.*

P. M. Augur of Connecticut, O. B. Hadwen of Massachusetts, and some others, consider it one of the best early varieties; a moderate grower, with a moderately good bunch. An amateur variety only, as its parentage gives no confidence in its health and value.

Early Golden. (*Labr.-Hybr.*) Produced by T. V. Munson of Denison, Texas, from a seedling of Campbell's Triumph (q. v.) and originally named by him "Campbell" in honor of that veteran horticulturist, but to avoid confusion in nomenclature with his *Campbell's Early*, Munson kindly withdrew the former name, by request, to be known hereafter as "*Early Golden.*" It is a WHITE grape of finest quality, resembling its parent, but earlier ripening, with or a little after the Delaware. *Vine* vigorous and productive, but tender and damaged in cold at 5° below zero, suffering also by drouth in thin soil. Its foliage resembles Concord. *Bunches* and *berries* medium in size, of a beautiful pale golden color, and thin skin, without pulp; seeds few and small; slightly subject to rot. A promising amateur grape for the garden.

H. Jaeger reported at the Missouri State Horticultural Society meeting, 1891–92: "I have observed the 'Campbell,' (now named Early Golden,) a white seedling of Triumph for seven years and have grown four good crops of it. It ripens with Delaware, keeps and ships admirably well. I had it hang on the vine perfectly sound till November, making a very good raisin. This grape is as pure, and free of pulp as any vinifera, resembling the famous 'Chasselas' or Gutedel.

The New York Experimental Station at Geneva report for 1892: "Our vines of this variety received from T. V. Munson in the spring of 1886, have successfully withstood a lower temperature than 5° below zero and borne fruit the following season. Ripens there however much later, about as late as Catawba.

Early Hudson. (?) An early, round, BLACK grape, of little value, except as a curiosity, inasmuch as some of the berries contain no seed.

Early Ohio. (*Labr. Hybr.*) A chance seedling raised by R. A. Hunt, of Euclid, Ohio. It was found in the summer of 1882, growing in his vineyard between a row of Concord and Delaware. Mr. Hunt states that the third year from seed it set thirty clusters, of which all but ten were removed; these were ripe the 20th of August. It has borne large crops every year since, ripening always a week or ten days earlier than "Moore's Early," on the same soil and under the same circumstances. The vine being a strong grower, quite as hardy and healthy as the Concord, which it resembles, with abundant, healthy foliage and fruit, frequently producing a crop the first year after planting; much earlier and better in quality than Hartford, with superior shipping quality. The Early Ohio is destined to be a popular and

EARLY OHIO.

profitable market grape, displacing the "Hartford," "Champion," "Janesville," and even "Moore's Early."

Bunch large, compact, frequently shouldered; *berries* only medium in size and quality, yet handsome in appearance; color BLACK, covered with a heavy bloom, and of a spicy, pleasant flavor, better than most other very early sorts and adhering tenaciously to the stem, a merit highly appreciated and sorely missed in some varieties for market. It is free from mildew and so far seems not very subject to rot. Roots abundant and fibrous, of firm liber; wood harder than Concord, with a small pith.

The Early Ohio has also been tested for wine, and *Harms Bros.*, who are among the best vintners of Ohio, consider it a promising red wine grape in every respect; the must weighing 104°, with but 6½ per mille acid.

The New York Experimental Station, S. A. Beach, Hort., reports 1893: Among more than one hundred and forty kinds fruited here this season, the Early Ohio was one of the first to ripen its fruit, being a few days earlier than Moore's Early.—He calls it a PURPLE grape.

Early Victor. (*Labr.* ×) A seedling from Delaware crossed on some vigorous grape of the Labrusca class, originated with John Burr,* of Leavenworth, Kan., about 1870. *Vine* very hardy, healthy, vigorous, and productive; *wood* dark gray, rather long-jointed; foliage thick, medium, dark green, deeply lobed, partaking somewhat of the character of the Delaware and Hartford not as pubescent as the latter. The original vine has not been injured by the severe cold and sudden changes of our climate, and has shown no mildew, rot or other disease for several years, but was later found more or less subject to rot.

"*Bunch* medium, compact, often shouldered, sometimes double shouldered: *berry* medium, round, BLACK with a heavy blue bloom; adheres to the peduncle until it shrivels; flesh slightly pulpy, juicy, sprightly, and vinous; agreeably sweet, without foxiness, Ripening season about 10 days in advance of Concord, nearly with Hartford and Moore's Early: it colors about 10 days before it is fully ripe; like the *Ives* it should be allowed to hang on its growing vines for about 10 days after it colors."

Geo. W. Campbell said: "I know of no black grape so well fitted to take the place of all the foxy abominations (Hartford, Ives, Champion, Janesville, Belvidere) which have been tolerated on account of their earliness. I am glad to recognize in this variety a *really good, very early* black grape, with a vine evidently of the healthiest and hardiest type of the Labrusca class."

In growth and general habit, as well as in the size and general appearance of the clusters, it resembles the *Hartford*; but, unlike the Hartford, it is a grape of excellent quality, slight pulpiness, small seeds, free from foxiness, the berry does not fall from the cluster even when overripe, and it makes a very good claret wine.

Early Wine. (*Linc.-Rup.*) See Munson's Seedlings.

*The originator of the Early Victor, the late John Burr, who had been very successful in Ohio, some fifty years ago (about 1845) in raising some fine new Strawberries, tried later when he removed to Kansas, to do the same also with the grape. He planted in his lot at Leavenworth, the Catawba, Bland, Isabella, Hartford, Delaware, Concord, Salem and Goethe. No others were allowed near his place to pollenize his grapes. He believed in natural fertilization. He held that nature selects under the environments the pollen most congenial to perpetuate its species and never makes a mistake. Man conjectures what he wants and attempts mostly in vain, to make nature yield to it. Proceeding on this principle, John Burr planted the best varieties, possessing some of the qualities he most desired, in close proximity to each other, so each variety could be fertilized by those most congenial. From these the best bunches were selected and the seed planted. Burr commenced first with the Concord, but afterwards, believing that it was not susceptible to much improvement, he discarded and destroyed all vines produced from its seeds, as well as his seedlings of Isabella, Hartford and others of marked Labrusca type and native flavor, (except *Osage*). He then selected Delaware, and his first to fruit from it was *Early Victor*. This was the first and *only* grape he ever disseminated; his *Jewel* grape he sold to Stayman and Black, and they propagated and disseminated it in 1887. With the first two and with *Ideal* and *Standard* he noted from what variety they originated; later nor he nor Dr. Stayman deemed this essential. (This explains the statement "from mixed seed" in the descriptions of those varieties). As they are all good and those from seed of their seedlings better than the first,—as Eclipse, Ideal, Primate, Omega, Paragon of Mr. Burr and White Beauty, White Imperial, Darvin, Ozark and Pawnee of Dr. Stayman,—the correctness of that principle seems proven.

In view of the many valuable Varieties with which father Burr has enriched the American grape, a short biographical notice may be welcome:

JOHN BURR, was born with the present century, Nov. 1800, at Bridgeport, Connecticut; a better, more useful and a happier man than his celebrated namesake, Vice President, Aaron Burr. He married Eliza Hooker of Hartford, Conn., and removed to Columbus, O.; successfully engaged in mercantile business, he at the same time earnestly devoted himself to fruit culture producing some fine new strawberries, "Burr's new Pine" and Burr's new Seedling, are still among leading strawberries of Ohio. In 1858 he removed with his family to Leavenworth, Kans., where he indulged in his favorite pursuit. The fascination for producing new grapes grew on him; he devoted himself to it with energy, love and enthusiasm. To this healthful pursuit may be attributed the remarkable longevity and the vigor of body and mind he preserved up to his death. He was domestic in his habits, yet sociable in his manners, a genial, modest, lovable man of the old school. The passing years stole but little fire from his mind and though afflicted with rheumatism he enjoyed the fruit of his successful labors; at the age of 91 years he was still engaged in his unselfish work, hopefully asserting that his next new grape would surpass his other splendid Varieties. In Dec. 1892, being over 92 years old he died and, according to his desire, was conveyed by his children and grand children to the family lot in beautiful Green Lawn Cemetery at Columbus, O. His name is honored and will be gratefully remembered among all.

EARLY VICTOR.

This engraving is a copy after an exact photograph of a medium sized cluster of the Early Victor

Eaton. (*Labr.*) A Concord seedling, grown by the late Calvin Eaton, of Concord, Mass. Vine vigorous and productive, strong and healthy, like its parent, but not as hardy in winter; with large foliage, resembling the old Union Village. *Bunch* and *berries* large and showy, making it attractive as a market grape or for exhibition; but in some localities it is a poor grower, ripens very irregularly and is hardly worth growing. The Eaton is not as high flavored nor as sweet as Concord; color, BLACK with blue bloom; skin thick, with tender pulp when fully ripe, juicy and pleasant with less of the native odor; ripens somewhat later than Concord which it resembles in foliage; yet in appearance of bunch and berry more to *Moore's Early* (q. v.), but sometimes with *much larger* double shouldered bunches.

Twenty years ago we received from a neighboring grape grower a vine under the name of *Mammoth Concord*, which we have growing since then in our experimental vineyard. This has now proven to be identical with the Eaton, or at least, if not the *same* grape and origin, it is so much alike in all characteristics, habits of growth, foliage, fruit, time of ripening and quality, that the two grapes cannot be distinguished. As our neighbor could tell us nothing about the origin of his grape, he claiming merely to have received it among a lot of Concords, we have never disseminated it nor offered it for sale.

The *Rural New Yorker* says: The quality of Eaton is, as we have often stated, not high, but the *great* berries are full of juice and a tender pulp, nearly free of foxiness, and release the seeds readily. But for the bees a crop of wonderfully showy fruit would be gathered; but the berries are attacked by the bees. . . . It must be remembered, however, that this was an exceptional season (1893) when their grapes suffered more loss from the insect, or bird which first punctures the berries, than ever before, so that scarcely a perfect bunch of red or black grapes has been gathered that season; white grapes are rarely attacked as black ones are.

Eclipse. (*Labr.* × ?) A peculiar grape, somewhat like Rogers' Goethe, yet quite distinct and superior in quality (?!) in the opinion of some connoiseurs, who tasted it. It originated from mixed seed, raised by the late John Burr, of Leavenworth, Kan. *Vine*, as all his seedlings which he produced and selected, very vigorous, hardy and productive. The original Vine never rotted nor mildewed and none were propagated and disseminated as far as we know. Bunch large double shouldered, *not* very compact; berry very large, WHITE with a distinct black spot; flesh tender, juicy sprightly, vinous sweet, of *best* quality, similar to a European grape.

Mr. Van Trump, reporting for the St. Louis Journal of Agriculture, wrote: "The Eclipse is as much superior to Goethe as the Concord is to the Fox grape: it is a beautiful transparent white. . . . It is impossible to form an idea of the exquisite quality of this grape till you have tasted it."

Eden. See Scuppernong Seedling (illustrated).

Edmeston. (*Labr.*) One of the hundreds of Concord Seedlings. This one originated in Adrian, Mich., by D. G. Edmeston, in 1890.

Edward. (*Labr.*) raised by Theophile Huber of Illinois City. Vine vigorous; bunch large, compact, shouldered; berries size of Concord, color golden YELLOW with shining skin; pulp tender, sweet.

Elaine. (*Hybr.-Labr.* × *Vin.*) Raised by C. Engle, of Paw Paw, Mich., from seed of Rogers' *Salem*. Vine a very strong grower, hardy and healthy. Bunch long, loose, berry large, MAROON, or the color of a fully ripe Catawba, ripens early. This is one of the best grapes, but unfortunately it is a shy bearer.

El Dorado. (*Labr.-Hybr.*) Another of Ricketts' seedlings, produced by crossing Concord with Allen's hybrid. Vine partakes strongly of the parent Concord in every particular, while in fruit the bunch is larger. A handsome WHITE grape, but does not always set fruit perfectly. *Berry* large, round, clear golden yellow with a thin white bloom and few seeds. It is a *full sister* to the Lady Washington (see portrait of Lady Washington) between which there exists a strong resemblance; ripens very early, and is perhaps the highest flavored grape in existence—possessing a delicate though decided aroma, resembling pineapples; foliage and habit of growth good. Like most of Ricketts' varieties, it is not doing well with us in the west, and we can recommend it only as a garden variety to the amateur.

Elizabeth. (*Labr.*) Originated on the farm of Joseph Hart, near Rochester, N. Y., and described in the Rural New Yorker: *Bunches* large, compact; *berries* large, roundish-oval, greenish WHITE with a purple tinge in the sun; flesh rather pulpy and acid.

Elsinburgh. (*Est.*) Syn., ELSINBORO, SMART'S ELSINBOROUGH. Supposed to have originated in Elsinburgh, Salem County, N. J. An amateur grape of fine quality; ripens early. *Bunches* medium to large, rather loose, shouldered; *berries* small, round; skin thick, BLACK, covered with a thin bloom; flesh without pulp, sweet, vinous. Leaves deeply five-lobed, dark green, smooth; wood long-jointed and slender, resembles Eumelan, (q. v.) Subject to mildew.

Elvicand. (*Cand.* ×) A combination of three pure Am. species of grapes; a cross of Elvira, (*Rip.* × *Labr.*) and Candicans, the Mustang grape of Tex. Originated by T. V. Munson, Denison, Texas. Vine vigorous and productive; foliage good; late in leafing out and flowering; flowers perfect; bears medium handsome clusters of beautiful dark RED berries covered with lilac bloom. Skin thin with slight astringency; pulp separates readily from the few small seeds and is tender, juicy sweet and sprightly with excellent flavor. Ripens about same time as Concord, or but very little later. The reliable Horticulturist of the N. Y. Experiment Station, S. A. Beach, who tested it recommends this in 1892 and again 1893 as a promising acquisition for more extended trial.—"I find 'Elvicand' one of the hardiest of Munson's." It is the pioneer of a distinct new family of grapes.

Elvira. (*Rip.-Hybr.*) A seedling of *Taylor*, raised by Jacob Rommel, of Morrison, Mo., first introduced and disseminated by us in 1874–75, without any restrictions, is now one of the leading white-wine grapes. The accompanying illustration was made for this Catalogue from a photograph of a medium cluster. *Bunches* small to medium, shouldered, very compact, in fact *too* compact; *berry* medium, considerably larger than Taylor, its parent; round, pale GREEN with white bloom, sometimes tinged with red streaks when fully ripe; skin very thin, almost transparent; it sets so very closely and the skin is so thin as to cause some of the berries to crack; pulp sweet, very tender and juicy, fine flavor. Ripens about ten days later than Concord.

Vine a most vigorous, stocky grower, eminently productive, often bearing four to six consecutive bunches from one eye; exceedingly healthy and hardy, having stood our hardest winters without protection. No rot to speak of, so that it furnishes the bulk for the production of our white Wines; foliage free from mildew in most unfavorable seasons. *Roots* like those of Clinton and Taylor. Canes stout and long with well-developed laterals. Wood harder than the Taylor, with a medium pith. Foliage large and strong, somewhat rusty and woolly on the lower side.

Since it has been established that the Taylor is itself a cross between *Riparia* and *Labrusca*, the characteristics of the Elvira are explained by its parentage. (See page 18.)

The Elvira makes a very palatable white wine, that improves with years, and is admirably adapted for blending with other grape juice of higher flavor, and is extensively grown for this purpose, but is unfit for marketing on account of its thin, easily-bursting skin. This disposition to crack and a tendency to over-bear, made its originator try to produce some still better grape, without these faults; and he may have succeeded in his "*Etta.*" q. v.

Emma. (*Labr.*) Originated by Theophile Huber, Jr., Illinois City, Ill., from unknown parentage. A singularly sweet grape; when fully ripe of shining YELLOW color. Bunch medium size, compact; Berry one third larger than Delaware; pulp very tender without core. Tested by Prof. J. L. Budd, of the Iowa Agr. College and described by him in the Iowa State Register, Sept. 30th, 1887.

Empire State. (*Labr.* × *Rip.*) A remarkable white grape; originated by JAMES H. RICKETTS from seed of the Hartford fertilizing with the Clinton. We have seen and admired both its beauty and excellence of quality at the Am. Pomol. Society's Exhibition at Boston, in 1881. The late Geo. A. Stone, of Rochester, N. Y., a nurseryman of enterprise and intelligence, bought the entire stock of this grape, for the highest price ever paid, perhaps, for a new grape, viz. $4,000.00, from the originator, who gave the following description of it:

"The Empire State is a seedling of the Hartford, fertilized with the Clinton; fruited for the first time in 1879. Its crop of 1880 was 48 bunches of most magnificent fruit. Grafts inserted in two-year old vines in 1880 produced in 1881 from 20 to 30 bunches per vine, ripening with the Hartford and Moore's Early. Nearly all of the bunches shouldered, and the finest shade of white ever seen in fruit. A good grower and fruiter in every respect.

Bunches large, from 6 to 10 inches long, shouldered; *berry* medium to large, roundish-oval; color WHITE with a very light tinge of yellow, covered with a thick white bloom; leaf thick, smooth underside; flesh tender, juicy, rich, sweet and sprightly, with a slight trace of native aroma, continuing a long time in use; vine very hardy. Its great productiveness, beautiful color, fine quality, extreme hardiness, vigor and healthfulness of vine and foliage, size and compactness of cluster, and good shipping qualities, *make it the best grape, all things considered, that I have yet produced.*"

Geo. W. Campbell, of Ohio, says—and we fully coincide with him—: It has *not* fulfilled the expectations which were entertained upon its introduction, for, although the vine is generally healthy and tolerably hardy, and the fruit, when well-grown, handsome in appearance and excellent in quality—it seems to lack the vigor and root-power necessary to carry and mature a profitable crop to perfection; and has disappointed the expectation of many who have *not* been able to grow it successfully and pronounce it a failure.

The late A. J. Caywood predicted at the Am. Pomol. Society Session 1887:

"I fear we shall be disappointed with it. With a full crop the clusters are small."

Geo. W. Endicott, an experienced horticulturist, says: I am satisfied that there is a mistake in its parentage; there is no doubt in my mind that it is a Hybrid of Clinton and some white European grape.

Eolia. (*Labr.*) See White Concord Seedlings, page 107.

Essex. (*Labr.-Hybr.*) Rogers' No. 41. Vine vigorous, healthy, and prolific if planted near some other Varieties, that blossom at the same time, to be fertilized. *Bunch* of medium size, compact, shouldered; *berry* REDDISH BLACK with blue bloom, round, somewhat flattened, in this respect resembling its native parent; flesh tender and sweet, with a high aromatic flavor. Ripens early, with Concord.

Esther. (*Labr.* ×) Originated by E. W. Bull, the well known originator of the Concord, and supposed to be a cross of this variety and Vinifera. Vine a fairly good grower, healthy and quite productive; bunch and berries large, WHITE, flesh dissolving; although solid in texture, juicy and sprightly vinous; quality best; ripens early. It is of the Pocklington type, but superior in quality; it has been growing for several years at the Rural New Yorker's grounds and is pronounced "excellent"—though not as tender pulp nor as pure in flavor as Diamond. *Berckmans*, Augusta, Ga., says: We have found this variety (Esther) after three years' fruiting a most promising one; quite productive and a fairly good grower. (He classes it as a Vinifera cross.)

Etawa. (*Labr.*) Syn., Woodruff's No. 1. An accidental seedling, raised by the late W. W. Woodruff, of Griffin, Georgia. Vine most vigorous, foliage luxuriant; bunch very large, also the berry; color BLUE, pulp dissolving, vinous, quality best; a very showy fruit, keeping sound on the vine for two months. (Committee on native fruits, Am. Pomol. Socty., 1883.)

Etta. (*Rip.*) Understood to be a descendant from *Taylor* in the third generation, a daughter of Elvira, raised by Jacob Rommel (first exhibited in 1879 as Elvira Seedling No. 3); resembles Elvira, with firmer skin, not disposed to crack, and is of very good quality. It ripens later. The vine is of very vigorous growth with strong, healthy foliage, hardy, and productive. This grape was awarded the premium "for the best bearing Cane of New Seedlings *for Wine*, quality and productiveness to rule," at the Mississippi Valley Horticultural Society meeting in St. Louis. Dr. L. C. Chisholm, Spring Hill, Tenn., to whom we sent the Etta for trial in his locality, reports very favorably, saying: "It is a very reliable late grape for this section—I like the Etta."

We consider this grape an improvement over *Elvira*, but not as free from rot as her parent.

Eugenia. (*Labr.*) See Miner's Seedlings.

Eumelan. (*Est.*) ("Good BLACK" grape.) This variety was found as a chance seedling at Fishkill, N. Y., where it has been in cultivation (in the garden of Messrs. Thorne) for many years, yielding abundant crops of grapes, remarkable both for goodness and earliness. The original vines were purchased by Dr. C. W. Grant, Iona Island, in 1866. We give the description from the circular of Dr. Grant, leaving out, however, all excessive praise, which, in our opinion, has damaged his success more than all his opponents. *Bunches* of good size, elegant form, and proper degree of compactness; *berries* large medium size, round, BLACK with fine bloom, adhering firmly to the bunch long after ripening; flesh tender, melting, all going to wine-like juice under slight pressure of the tongue; ripening very early, with the Hartford, and evenly to the center. Flavor very pure and refined, very sugary, rich and vinous, with a large degree of that refreshing quality that belongs distinctively to the best foreign wine grapes. *Roots* abundant, thick, spreading, and of medium toughness; liber thick but firm.

EUMELAN.

Vine a strong, slow, grower, producing remarkably short-jointed wood, with numerous and strong laterals; buds large and prominent; wood hard with a small pith; leaves large, thick, dark colored, firm in texture (it strikingly resembles Elsinburg), and, though subject to mildew in unfavorable seasons, it is a very fine early grape.

The American Horticultural Annual for 1869 said of the Eumelan: "This variety has been tested in several localities. It has proved with us, near New York, remarkably healthy in foliage, and has taken several premiums as *the best* BLACK *grape* at several exhibitions." Then again reports came from many localities, that it had failed to meet public expectations. In our vineyards at Bushberg, it has proved, in favorable seasons, all that was claimed for it, but after several years the Eumelan suffered severely from mildew, and since then they have not fully recuperated.

Experiments show also that the Eumelan is practically unable to set fruit of itself, needing fertilization by other vines.

The Eumelan makes a superior red wine, must 93 to 100 , with only 4 per mille acid.

We give a figure of a bunch and leaf reduced in size, and a single berry of full natural size.

Eureka. (*Labr.*) A seedling of Isabella, originated by S. Folsom, of Attica, Wyoming Co., New York, similar to its parent in appearance, but claimed to be earlier, hardier and healthier, also of better flavor, and to keep better than Isabella. Folsom has since raised eight seedlings of the Eureka, which are said to be remarkable for earliness, fewness of seeds, and other good qualities. Unknown in the West.

Eva. (*Labr.*) See White Concord Seedlings, page 107.

Evaline. (*Labr.* ×) Raised by the late John Burr, from seed of his seedling "Ideal," a grandchild of the Delaware, as it were; not a vigorous grower, yet quite hardy and productive; free from rot and so far not showing any mildew; bunch medium, compact; berry medium, WHITE, very tender, without pulp; juicy, sweet and sprightly, pure as a fine European grape; ripe before Concord.

Excelsior. (*Labr.-Hybr.*) A seedling of the Iona fertilized with the pollen of Vinifera, originated by Jas. H. Ricketts; first offered in autumn of 1882. The *vine* is moderately vigorous, short-jointed; *leaves* medium, moderately thick, lobed, coarsely serrated; *bunch* large to very large, shouldered, often double shouldered, moderately compact; *berry* medium to large, roundish inclining to oval, skin pale red, sweet, slightly vinous with a rich aromatic muscat flavor; the berries

adhere well to the peduncle, and continue a long time in use. Ripens a little before the Catawba.

Ricketts says that this is the finest grape in his collection; that it withstood severe winter frost without any protection, but gives better results if protected. It is inclined to overbear, so much so, that every other eye of the fruiting-cane should be rubbed out; to produce bunches of the highest quality and beauty, the fruit should be thinned to one bunch to a shoot. As all of Ricketts fine hybrids it is suitable only for careful amateur culture, in favorable localities.

Exquisite. (*Æst.* ×) Originated by Dr. J. Stayman, of Leavenworth, Kansas, from seed of Delaware (see note on production of new Seedlings by him under Description of Delaware, page 114.) Vine not very vigorous, but productive and free from rot. *Bunch* medium, compact; *berry* small BLACK, very tender, juicy, rich vinous sweet; quality best, ripens about with Delaware and is a delicious little grape; for amateurs only.

Faith. (*Rip.* ×) One of Jacob Rommel's Taylor Seedlings. Vine a vigorous, healthy grower, sufficiently productive, of long-shouldered medium size *bunches; berries* small to medium, WHITE or PALE AMBER colored; juicy, sweet and pure flavored. Ripens early, with or before the Hartford. An excellent grape, not sufficiently appreciated.

Fancher. (*Labr.*) See Catawba.

Farrell. (*Labr.* ×) Origin obscure; said to have been found in Dr. Farrell's garden, as a chance seedling. It was named by Dr. J. Stayman and disseminated by him, the vine being very vigorous, healthy, hardy and prolific; and so far free from rot and mildew. The *bunch* is very large, long, shouldered, rather compact; the *berries* above medium, WHITE, very tender, juicy, sprightly, vinous, sweet; quality excellent, ripe about with Concord.

Far West. (*Æst.*) The Nestor of Western grape culture, the late Frederick Muench (died in 1881), received form time to time grafts, for testing, of Mr. Hermann Jaeger (Neosho, Mo.), who made it his task to explore the forests of south-west Missouri for wild vines. Among these was a feeble graft which fruited after several years, and astonished him by the delicacy of the aroma of the wine made from same, so much so that he honored it by the name "*Far West*," his own literary *nom de plume*.

Muench described it as follows: "*Vine* of vigorous growth, with unusually large, healthy foliage, perfectly hardy, resisting (in my experimental vineyard) all diseases in the most unfavorable seasons. *Bunches* shouldered and of good size. *Berries* somewhat larger than Norton's; skin very tough, BLACK with fine blue bloom. The pulp of its berries is soft, meaty, melting; is of dark rich color, with few seeds, sweet and spicy; making a wine so mild, and yet at the same time fiery and aromatic, as to surpass (to *my* taste) other known wines. Requires a long season, blooming and ripening its fruit very late, contemporaneously with Norton's. Its propagation from cuttings seems almost impossible except by layering; layers not separated from the mother-vine until after the second summer."

Fena. (*Labr.* ×) Produced by Ludwig Hencke, Collinsville, Ills. A seedling of Jewel (John Burr's) similar to that excellent variety, but vine a more vigorous grower and fruit larger in bunch and berry than its parent, yet only medium in size, BLACK, quality fine.

Fern or Fern Munson. (*Linc.-Hybr.*) A Hybrid of the Texas Post-Oak grape and the Triumph, produced by T. V. Munson of Texas. Vine vigorous, late in leafing out, flowering and ripening of fruit; flowers perfect, cluster and berry large; berry persistent, color DARK PURPLE—almost black: skin thin, tough; pulp tender, juicy and sprightly, of fine quality; ripens long after Concords are gone, when the market is bare of other grapes; considered very valuable.

Flora. (*Labr.*) Origin Philadelphia, Pa. *Bunch* small, compact; *berry* small, roundish, oval, PURPLISH-RED. Flesh somewhat pulpy, acid at centre, juicy, vinous. Ripens about with Isabella. Vine hardy and productive.—*Downing.*

Florence. (*Æst.* ×) Probably a cross between Union Village *m.* and Eumelan *f.*, originated by Marine. A very handsome showy grape, of good quality; *bunch* large, with some of the Isabella character. Discarded.

Florence. (*Labr.* ×) Another duplicated name! A seedling of Niagara, produced by the late A. J. Caywood, of Marlborough, N. Y., by crossing the former with Duchess. We have been unable to get a description or criticism of this variety. It is, of course, a WHITE grape, and, though almost unknown, may be an improvement even on his "Duchess." The enthusiastic originator died in 1889, and, owing to some unfortunate circumstances, his once celebrated establishment was discontinued.

Florence. (*Labr.?*) And this is a *third* by that name, a BLACK grape, *earlier than all;* ripening at Ottawa, Canada, before the *Champion* even. John Craig, the eminent horticulturist of that experiment station, describes it as follows: Vine a short jointed, slow grower; leaves small, very pubescent; bunch and berry medium to small. Quality only medium; the fruit is very perishable, shrivelling on the vine soon after maturing. As a grape for garden culture in the colder sections it is valuable. Not a market grape in any respect.

Flower of Missouri. A Delaware seedling, grown by Wm. Poeschel, Herman, Mo. Not disseminated, and probably never will be. It possesses both the excellence and the defects of "Walter."

Flowers. (*V. Rotund.*) Syn., BLACK MUSCADINE. A variety of the Scuppernong type. *Berries* large, growing in clusters of 10 to 15; BLACK, sweet. Ripens very late; hangs upon the vine until frost. Said to make a rich, red, and delicious wine. Never fails to produce a crop, and perfectly free from and kind of disease. It is much esteemed (in Georgia, Alabama, and South Carolina) on account of its lateness, as it does not come in until the Scuppernong is gone.

Berckmans, of Georgia, says it is not quite as good as the Scuppernong and of about the same size.

Francis B. Hayes. (*Labr.*) See HAYES.

Framingham. Perhaps not identical with, but only a reproduction of, the Hartford—at least so closely resembling it that it should not have been introduced as another variety.

Franklin. (*Rip.*) Vine has much the habit and growth of Clinton; not as good a bearer. *Bunch* small, not very compact; *berry* small, BLACK, juicy, quite acid, austere; unworthy.—*Downing.*

Gaertner. (*Labr.-Hybr.*) Rogers' No. 14. Hybrid between White Chasselas and a wild Labrusca. The late Marssall P. Wilder described it as follows: *Bunch* good size; *berry* medium to large; color LIGHT BROWN or RED; skin thin; flavor pleasant and aromatic; season rather early; vine healthy and productive. One of the best and most valuable of Rogers' Hybrids. It has been somewhat neglected, but receives now deserved attention, being an excellent grape, almost transparent, and the most showy, perhaps, in our collection among the red varieties. Resembles Massasoit, but of finer quality.

Gallup's Seedling. (*Labr.-Hybr.*) Originated at Adams' Basin, N. Y., from a seedling of Rogers' Salem, which it is said to resemble in appearance. Not known nor tested in the West.

Garber. (*Labr.*) A seedling raised by the late J. B. Garber, of Columbia, Pa., who also originated the Mary Ann and North Carolina. Superior to these. *Bunch* below medium, *berries* full medium, very compact; BLACK, with very dark juice, makes a very good wine, and is of fair quality for the table. Vine hardy, a vigorous grower and immensely productive. Ripens among the very earliest. It resembles the Worden so much that some grape growers cannot see any difference between them, but Judge Miller says it is not quite similar and that the Garber is two weeks earlier.

Gazelle. One of Ricketts' Hybrids, produced many years ago but neglected, and remaining unknown until Sam. Miller, to whom he gave a plant or graft of this his almost forgotten child, tested it and says it is SPLENDID. *Bunch* large; *berry* about the size of Herbemont; color nearly WHITE, almost translucent; sweet and delicious. Its growth pleased us very much. See Ricketts' Hybrids.

Geneva. (*Labr.-Hybr.*) Originated by Jacob Moore, of Attica, N. Y., it is the result of two crosses, the first in the year 1865, being from seed of the Black Fox (*Labr.*) fertilized by the Muscat of Alexandria. The second cross, planted in the spring of 1874, at Brighton, Monroe county, N.Y., was raised from one of the best hybrid seedlings —a large red grape—fertilized by Iona; the one named Geneva being one of the best of that progeny. The Vine is a strong grower, hardy and free from mildew thus far, has large leaves, peculiar for curving downward at the edges; in hardiness of the bud it ranks with the Pocklington. The *bunch* varies greatly in size, being sometimes very long, usually medium, cylindrical or slightly shouldered, loose. *Berries* large and obovate, the lower portion of it being larger than the stem portion; color LIGHT YELLOW when fully ripe, translucent, with from one to three seeds, which may be distinctly seen if raised in bags; it has a peculiarly lustruous surface with little bloom, characteristics which, once noted, enable anyone to identify the Geneva from other white grapes. Its flesh is juicy, dissolving, vinous, sprightly and agreeable. It is not of highly refined characters, but has the remarkable good quality of improving in flavor by keeping if picked before over-ripe, and is especially valuable as an excellent keeper and shipper, the berries clinging firmly to the stem. Ripens about a week after the Concord.

Josiah Hoopes, of Pennsylvania, a trustworthy authority, places the Geneva as among our best native grapes, and says that on his grounds it perfected last season (1892) the largest crop of any variety in his collection. At the New York Experiment Station, at Geneva, N. Y., it did not reach expectations in quality.

Giant Leaf. (*Æst.*) See Riesenblatt.

Gilt Edge. (*Æst.*×*Labr.*) Originated by Dr. Chisholm, at Spring Hill, Tenn. A Delaware Seedling. Vine thrifty in growth and foliage, but rather a shy bearer. Fruit much like its parent in size of bunch and berry, but quite different otherwise, being CREAM colored; quality fine, of a delicate flavor, quite peculiar, slightly subacid.

Glenfield. (*Labr.*) A chance seedling from the grounds of Geo. J. Magee, of Watkins, N. Y. *Bunch* large, shouldered, compact, attractive; *berry* large, nearly round, of a peculiar GRAYISH color covered with whitish bloom; pulp very tender, juicy, sweet, with an agreeable flavor, neither foxy nor astringent. As a table grape it has many good qualities, worthy of a place in the amateur collection.

Goethe. (*Labr.-Hybr.*) Or Rogers' No. 1. This very valuable variety is, perhaps, more unique and shows in its fruit more of the character of the European species than any of Rogers' other sorts, and yet its vine is one of the hardiest, healthiest, and most productive. Late in ripening for northern localities, it does not always mature there; but here with us it produces and perfectly ripens a large crop of beautiful clusters and berries, free from imperfections of any kind, provided it has a good rich soil, and has not been permitted to overbear, which would ruin its health and productiveness for years to come, if not forever. A sandy soil seems also favorable for its continued health, as the *roots* of the Goethe, though thick—generally of a scraggy and warty exterior—are feeble, and in clayey soil may, perhaps, become a prey to the phylloxera. The vine is a most vigorous grower, making stout and long canes, with well-developed laterals. Wood rather soft, with a moderate pith.

At the Fall meeting of the Mississippi Valley Grape-Growers' Association, Sept. 9, 1868, we exhibited for the first time a few branches of the vine, each with several perfect clusters, which were much admired, and would probably have astonished the originator, could he have seen them. The smallest of them, being of a good average size, we had photographed, and an exact copy of it expressly engraved for this Catalogue. The *bunches* are medium to large, not quite compact, occasionally shouldered: *berries* very large, oblong, of a YELLOWISH-GREEN, sometimes blotched, with a PALE RED toward the sun and entirely RED when fully ripe; skin thin, translucent; flesh tender and melting throughout; few seeds; sweet, vinous, and juicy, with a peculiar, delicious aroma. Specific gravity of must 78°; altogether a MOST DESIRABLE grape for the Middle Atlantic States, the Ohio and Lower Missouri Valleys, both for the table and for wine, but even in South Florida, in the experimental garden at Waldo, on the beautiful shores of Lake Santa Fé, some Goethe were admired larger in size and more compact than were ever seen on the mother vine; but there also fine specimens of Chasselas and Black Hamburg are grown in open air grafted on Æstivalis

Gold Coin. (*Æst.* ×) Produced by T. V. Munson in 1883 by pollinating Norton with Martha. Vine vigorous, late in leafing, shedding leaves and flowering, very hardy and productive, flowers perfect; clusters medium, berry medium to large, persistent, rich GOLDEN YELLOW when fully ripe.

GOETHE.

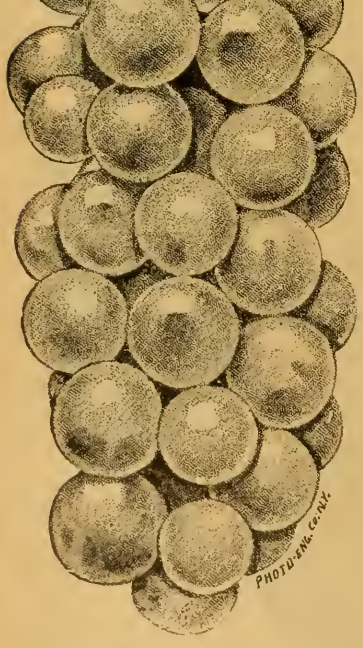
rarely touched by rot; skin thin but tough, pulp not tender, yet juicy of agreeable flavor, becoming very sweet when fully ripe. A showy market grape and will make a very good white wine.

Golden Berry. (*Labr.-Hybr.*) A white seedling of the *Hartford* and *Gen. Marmora*, originated by Dr. Culbert, Newburg, N. Y.; hardy and a free bearer. Exhibited 1877.

Golden Clinton. (*Rip.*) Syn. KING. A seedling from the Clinton closely resembling it, but with this difference, that its berries are GREENISH-WHITE, and that it is far less productive. Campbell is perfectly correct in saying: "It does not sustain the character given by those who first introduced it. *Bunches* small, scanty, and irregular; *berries* small and of inferior quality."

Golden Concord. (*Labr.*) See Concord White Seedlings, page 107.

Golden Drop. (*Labr.-Hybr.*) An early white grape, raised by Pringle in 1869, from the Adirondac, fertilized by the Delaware. In size of bunch and berry it resembles Delaware. Color YELLOWISH-WHITE, with a tinge of red when in the sun; *bunch* cylindrical, seldom shouldered, small, close; *berry* smallish, round; flesh tender, though slightly pulpy, juicy, very sweet and pure flavored, without the slightest foxiness. The vine is a good grower, yearly loaded with fruit, leaves small, obscurely lobed, tomentose beneath, showing superior capacity to resist mildew and thrips.



GOLDEN DROP. (Actual Size.)

This purely native and hardy variety is admired by some for its delicate flavor. Its surpassing earliness makes it valuable for planting in our northern districts where none of the varieties in cultivation are sure to ripen thoroughly every year.—*Bliss & Son.*

Golden Gem. (*Aest.-Hybr.*) A seedling of the Delaware and Iona, a superb table grape, of GOLDEN color, produced by J. H. Ricketts; first exhibited at the Am. Pomological Society meeting in 1881. Vine moderately vigorous; wood short-jointed; leaf small to medium, slightly serrated; *bunch* small and sometimes shouldered; *berry* small and of a rich GOLDEN color; flesh tender, juicy and rich, with a fine rose flavor; quality best. The fruit ripens very early, even before Hartford, and continues a long time in use without losing any of its good qualities. Wherever either of its parents, the Delaware or the Iona, can be successfully grown, this superior grape deserves special attention.

Golden Pocklington. (*Labr.*) See Pocklington.

Governor Ross. (*Labr.-Hybr.*) See Munson's Seedlings.

Graham. (?) An accidental seedling, introduced by Wm. Graham, of Philadelphia; *bunch* of medium size, not compact; *berry* half an inch in diameter, round, PURPLE, thickly covered with a blue bloom, contains little or no pulp, and abounds in juice of agreeable flavor. A poor grower and bearer.—*Downing.*

Green Castle. (*Labr*). See Marine's Seedling.

Green Mountain. (*Labr.*) This *very early* WHITE grape is a chance seedling, found growing on one of the slopes of the Green Mountains, of Vermont, and was introduced by a Mr. Paul and propagated by Stephen Hoyt's Sons, of New Canaan, Conn., who secured the entire franchise of this seedling and had the same registered, as their Trade-Mark (see figure). The "*Winchell*" (q. v.) is claimed, however, and generally admitted to be identical; and under pomological rules this, being the earlier name, which is that of its discoverer in Vermont, is entitled to precedence. *Vine* very vigorous and healthy, with large foliage; no mildew; productive, a profuse bearer, fruit of very good quality; *bunches* of medium size, well shouldered; *berries* of GREENISH-WHITE color, medium size, *skin* thin, pulp tender and sweet, with few and small seed; taste of excellent flavor, free from foxiness. Peculiarly adapted to the northeast climate of our country. Prominent horticulturists and fruit growers of New York, Massachusetts, Connecticut and New Jersey express golden opinions of the "Green Mountain," and predict a great future for this really fine grape, being also one of the earliest to ripen of all our native varieties. Ellwanger and Barry recommend it, "*The Winchell Grape.*" saying: It has been tested for several years in our vineyards and has proven satisfactory in all respects. It combines hardiness, fruitfulness, vigor, good size and excellent quality. Friend Munson considers his "*Bell*" equal not only but superior to the GREEN MOUNTAIN.

The description of the *Bell*, one of T. V. Munson's best grapes, has been accidently omitted in this Catalogue (p. 90.) It is a hybrid of Elvira with Delaware, and will prove *best* in our Central States (Ohio, Ky., Tenn., Ind., Ills., Mo., Kan., and the S. C. S.), while Green Mountain may be better adapted to the North. Both deserve to be extensively planted, they are healthy and hardy, good and sure producers, ripening before Concord.

GREEN MOUNTAIN, OR WINCHELL.

Green Ulster. (*Labr.*) Originated with John B. Moore, of Concord, Mass. It was first exhibited in 1879 before the Am. Pomological Society; the report calls it a WHITE grape of excellent quality; it is a moderate grower and holds its foliage until frost. The vine is healthy and hardy, about as vigorous as Martha. Bunch and berry of medium size, excellent quality, ripens a week before Concord; its foliage resembles Martha. It is most probably of same parentage.

Grein's Seedlings. (*Rip.-Hybr.*) A lot of Taylor Seedlings raised by the late Nicholas Grein, near Hermann, Mo., and by him supposed to have been produced from seed of the European Riesling which he had sown, but which, as proven afterwards, was mixed with *Taylor* seed; the European Riesling did *not* come up at all, while from the *Taylor* (*Rip.* ×) sprang Grein's No. 1, named "Missouri Riesling." (See descr.)

No. 2—GREIN'S GOLDEN. Somewhat similar to his Missouri Riesling, but a stronger grower; *bunch* medium, not very compact, handsomely shouldered: *berries* larger than most other *Taylor* seedlings, of a deep YELLOW GOLDEN color, bronzy toward the sun; sweet, juicy, with little pulp. Ripens with Concord. A valuable grape for family use, table, and market.

No. 3—much resembles his Missouri Riesling in bunch and berry; said to contain more sugar and to make still better wine.

No. 4—also resembling the former, and said to make a very fine wine of a deep GOLDEN color and delightful flavor.

No. 7, or Grein's *extra early*. Vine a vigorous grower, moderately productive; bunch and berry resembling Delaware in size and shape but not in color, which herein is a beautiful GREENISH-YELLOW, with a distinct star-like speck on each berry. Ripening about same time as Concord.

Grove. (*Labr.* ×) Originated by Thomas Grove, of Tecumseh, Neb. A seedling of Concord crossed with Clinton. Vine hardy and productive; bunch medium, sometimes shouldered; berries medium, WHITE, turning amber in the sun; skin thin but very tough; pulp tender, sweet; ripens a few days later than the Concord.

Guinevra. (*Hybr.-Labr.* × *Vin.*) Originated by C. Engle, of Paw Paw, Mich., a seedling of Salem. (Rogers 53.) Vine very vigorous, productive; bunch large, long, seldom shouldered, compact; often as solid to the feeling as an ear of corn; berry large, WHITE, ripens late, too late for Michigan, where it originated, unless the season happens to be unusually long. Further south it would probably do better, and where tested is said to be of very good quality. Not disseminated.

Hagar. (*Est.-Hybr.*) See Alvey, p. 85.

Halifax Seedling. (*Labr-Hybr.*) See Wylie's Seedlings.

Hall. (?) We find a variety by that name at the experiment station of Michigan claiming to be originated in that State; another of the same name grown by D. Hall, Urbana, Ohio. Both as yet unknown.

Harmer. (*Labr.* ×) A cross between V. Labr. and V. Riparia, found in Hartford county, Conn., by D. Alderton, Marlboro, N. Y. A rampant grower with bright green leaves, slightly downy underneath, healthy and hardy; bunch below medium; moderately compact; berries medium; BLACK; hard pulp, of peculiar spicy taste, sweet, not very productive, late; said to make a nice, good red wine.

Harrell. (*Labr.*) A chance seedling orginated by Obed Harrell, of Chrisman, Ills. Vine vigorous and productive. Cluster medium, compact, berry medium, WHITE, very sweet. [*Mitzky's Our Native Grape. Not known to us.*]

Harrison. (*Labr.*) A seedling of Concord, produced by Isaac Staples, Dayton, Ohio. Vine as vigorous, hardy and thrifty as its parent, also leaf healthy and thick; bunch medium to large, moderately compact; berries medium, RED, quality good, flavor pure, no foxiness: ripens with the Concord. [*Mitzky's Our Native Grape.*]

Hart or Hart Grape. (*Est.*) See Lincoln and Devereux.

Hartford. (*Labr.*) Syn., HARTFORD PROLIFIC. The standard for earliness among grapes. Was raised from seed of Isabella by Steel, of Hartford, Conn., over forty years ago. It is well-known and generally planted as a very prolific early market variety; ripens about ten days in advance of the Concord; but as soon as ripe it generally drops its fruit, and is of poor quality. The vine is very healthy and hardy, and produces immense crops. *Bunches* large, shouldered, rather compact; *berries* round, full medium, BLACK; flesh pulpy, juicy, with a perceptible foxy flavor: *roots* very abundant, branching and fibrous, of average thickness and toughness, and tolerably firm liber. Canes stout, with strong crooks at the joints, laterals well developed, and having considerable down on the young growth. Wood hard, with a small pith. As a market grape it is considered valuable by some, on account of its earliness and great productiveness, but even as such it is inferior to several others.

FRAMINGHAM and SENECA are almost identical with HARTFORD; the PIONEER and YONKERS HONEY DEW are similar to it, but considered better grapes. Let us discard the Hartford, which only destroys the appetite for grapes, and injures the sale and price of all sorts; while a *really good* very early market grape would increase the demand for all later varieties. And we have now by far better very early varieties. EARLIER than Hartford even. (See Early Ohio, Moore's Early, besides several others.)

Harwood. (*Est.*) Syn., IMPROVED WARREN; obtained from Major Harwood, of Gonzales, Tex., similar to Herbemont in every respect except size of berry, which is nearly double the size of that of Herbemont; it also varies in color, sometimes being no darker than Diana; ripens four or five days earlier than the Warren or Herbemont. It originated in the garden of Colonel Harwood, at Gonzales, Texas. This grape has short-jointed heavy canes, is not as rank a grower as Herbemont, and does not grow readily from cuttings.

Haskell's Seedlings. Of the very large number of hybrids produced by the long-continued and expensive labors of George Haskell, of Ipswich, Mass., he has selected forty varieties, designated by numbers only, which he offered for sale in 1877; but as he would not sell less than thirty vines to any one grape-grower or nurseryman at a price which, though low, considering their cost to the originator, yet exceeds the ability of most grape-growers,—and as they are all hybrids between the *foreign* (Black Hamburg, White Frontignan and White Chasselas) and native (Black-fox, Amberfox and Pigeon), and had not been tested in other localities, very few of them have been distributed.

Our proposition to take a few only, for trial, was declined, although Haskell says himself in his very interesting "Account of various Experiments for the Production of new and desirable Grapes," that it cannot be desirable to propagate so many varieties in any locality. Thus the results of his long and meritorious labors will probably forever remain in obscurity; and while a pecuniary recompense was not, fortunately for Haskell, "by any means a matter of necessity" with him, it is to be regretted that the results he obtained, which might have been a benefit to the public and of value to this country, were thus lost. This from our Catalogue (3d edition, 1883), and now, after more than ten years, we never heard of Haskell's grapes anywhere, excepting one (the "RUBY" q. v.), although the fruit committee of the American Pomological Society, and other authorities to whom Haskell sent some of these grapes for judgment, pronounced several of excellent quality.

Hattie or Hettie. There are three or more grapes under this name, under conflicting descriptions. One originated with Mrs. N. R. Haskel, Monroe, Mich.; described as a bright, clear RED, translucent grape; an other, introduced by E. Y. Teas, of Richmond, Ind., as a large, oval, BLACK grape—"earlier, larger and better than Concord and Isabella;" still another, a chance seedling grown by J. A. Putnam, Fredonia, N. Y., said to be similar to Amenia (q. v.), ripening with Moore's Early; if so, it should be tried and push its way forward. And another of unknown origin. *Bunch* small; *berry* BLACK; flesh somewhat pulpy; a poor grower and bearer, but ripens early. All remained so far unknown.

Hatton. (*Labr.* ×) A cross between Faith (Rommel's) and Ives, produced by Rautenberg of Lincoln, Ill. A strong and healthy grower, hardy and very productive; resembling "Faith" in foliage, but "*Telegraph*" in appearance of the fruit; *bunch* medium, compact; berry medium, BLACK, vinous; ripens a little after Concord; a better keeper, seems less inclined to rot. A grape of promise and may prove valuable.

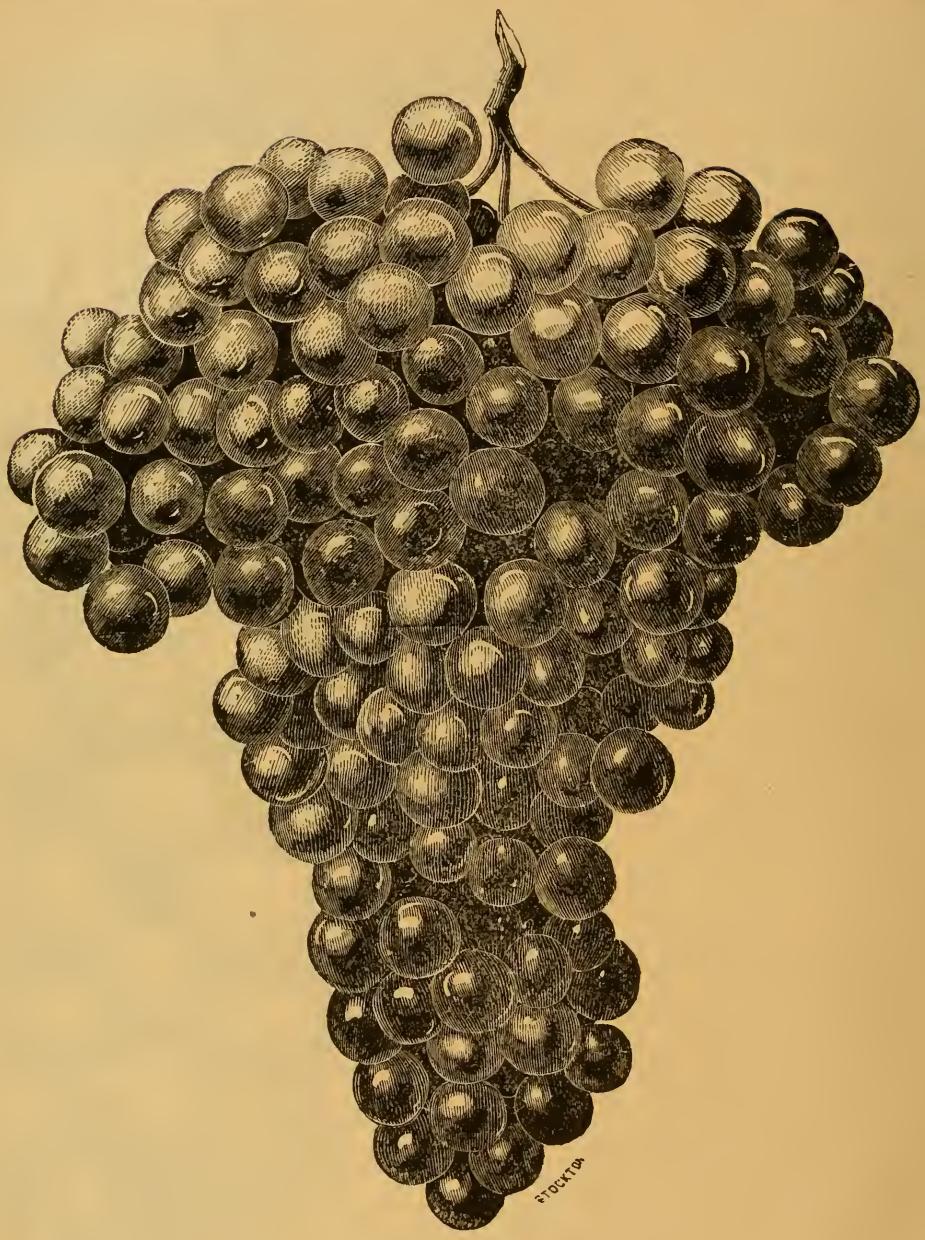
Hayes. (*Labr.*) Syn., FRANCIS B. HAYES. This is a very early white grape, raised from Concord seed by John B. Moore, of Concord, Mass.; it is smaller than Martha, but better in quality; was awarded a first-class certificate of merit by the Mass. Hort. Society. *Vine* hardy and a vigorous grower, moderately prolific, free from mildew; wood short-jointed; *bunch* medium, moderately compact, partly shouldered; *berry* medium, globular, with a fine AMBER-YELLOW color; slightly whitish blossom, *skin* very firm; *flesh* tender, juicy, of a delicate texture and fine flavor, free from foxiness. Ripens from 7 to 8 days before Concord, yet holds its leaves after those of most other varieties are killed with frost.

This WHITE grape attracted special notice for quality and earliness. The originator introduced it with the following remarks: "It is our endeavor to place before the fruit growers of the country, a grape of quality, possessing certain desirable and distinct characteristics which are rare exceptions in grapes of this class. This grape is a *pure native*, possessing hardiness and vigor to a degree seldom attained by other white varieties, and especially adapting it for cultivation in *northern and eastern sections*."

It should be planted in localities where the summer-heat is comparatively limited.

THE HAYES (or FRANCIS B. HAYES.)

Herald. (*Labr.*) Of unknown parentage, produced by the late G. A. Ensenberger of Bloomington, Ills. (in 1888). Vine vigorous and productive, foliage good; bunch medium, compact; berry above medium size. One of the *earliest* BLACK grapes, but poor in flavor and quality: not equal to Moore's Early which ripens but little later.



THE HERBEMONT GRAPE.

Herbemont. (*Æst.*) Syn., Warren, Herbemont's Madeira, Warrenton, Neil Grape. Origin unknown; as early as 1798 it was propagated from an old vine growing on the plantation of Judge Huger, Columbia, S. C. Nicholas Herbemont, an enterprising and enthusiastic cultivator of the grape, found it there, and from its vigorous growth and perfect acclimation at first correctly supposed it to be a native; he afterwards, in 1834, was informed that it had been received from France, and he believed this. But the same grape was also found growing wild (?) in Warren county, Ga., and is there known as the Warren grape. The best authorities class it as a member of the Southern Æstivalis family — a native grape, truly called by Downing, "Bags of Wine." One of the very best and most reliable grapes for both table and wine, especially adapted for hill-sides on

limestone soil. It flourishes in Texas, Georgia, South Carolina, and Florida, but generally only on poor hill-land. Should not be planted further north than the Ohio and Lower Missouri Rivers, and even there should be covered in winter. For those who have gone to this trouble it has nearly always produced a splendid crop, and has been so enormously productive that it richly repaid the little additional labor, except where rot destroyed the crops; and it may be mentioned that the rot on the Herbemont and its family is different from the rot which attacks the Labrusca. In Southern Texas, where the Herbemont is a perfect success, grape culture is gradually but steadily extending, so that, at no distant future, vine-culture will become one of the leading industries of its people. M. Lespiault reports: "Le vin de l'Herbemont fait en blanc est excellent et peut rivaliser avec les vins blancs de nos meilleurs crûs." At the Exposition of the International Congress at Bordeaux, M. Lepine exhibited a Herbemont vine, whose two arms had forty bunches on one and sixty bunches on the other, all perfectly ripened. The sight of this superb and immensely productive sample made many converts of former opponents of the American vine. *Bunches* very large, long, shouldered and compact; *berries* small, BLACK, with a beautiful blue bloom; skin thin, flesh sweet, without pulp, juicy and high-flavored; ripens late, a few days after Catawba. *Roots* of medium thickness, with a smooth, hard liber, resisting to the Phylloxera in France as well as here. Canes stout, heavy and long: laterals well-developed. Wood hard, with a medium-sized pith, and firm outer bark. Vine a very vigorous grower, with the most beautiful foliage; not subject to mildew, and but little to rot; in rich soil it is somewhat tender, makes too much wood, and seems less productive, while in warm and rather poor limestone soil, with southern exposure, it is generally healthy, and enormously productive, except in very unfavorable seasons, when all half-tender varieties fail. Werth, of Richmond, Virginia, says: I have found the most uniformly abundant, healthy, and thoroughly ripened crop, for successive seasons, on low, imperfectly drained, and rather compact soil. Eisenmeyer, of Mascoutah, Ill., finds summer pruning, promptly performed at the close of the flowering season, very effective in securing a fine crop of Herbemont grapes. The accompanying illustration gives an idea of the beauty and richness of the bunch. Specific gravity of must about 90°. The pure juice pressed, without mashing the grapes, makes a *white* wine, resembling delicate Rhenish wines: if fermented on the husks about forty-eight hours, it will make a very fine pale red wine. The French wine judges at Montpellier, pronounced it "assez agréable, rappellant le gout des vins de l'est de la France."

In former years but very few seedlings of the Herbemont have been raised; One Herbemont seedling is mentioned by Dr. Warder in his description of the "Longworth School of Vines." The *Pauline* (q. v.) may be a seedling of Herbemont, also the *Kay's* Seedling, from Kentucky, and the *Muskogee*, but little is positively known of these varieties.

The *McKee* was looked upon as a Herbemont seedling, with fruit larger than Herbemont and about a week earlier, but, after careful comparison, it is pronounced as identical with Herbemont. Onderdonk does *not* pronounce it to be the Herbemont itself, showing some difference between the two; but not sufficient to make it a distinct variety.

In the previous edition (1883) of this Catalogue we stated: "If WE intended to raise new seedlings (which we do *not*), we would select the Herbemont as one parent in preference to almost any other variety." Our esteemed friend, Prof. Munson, the eminent originator of new valuable varieties, following our hint, produced a large number of seedlings and hybrids from the Herbemont among whom he selects as best 1, the "*Hermann Jaeger*" (see descr. p. 138); 2, the "*Lindherbe*" (Lindley & Herbemont): 3, the "*Delicious* (Post Oak × Herb.); 4, "*Mrs. Munson*" (Neosho × Herb.); 5, the "*Muench*" (Neosho × Herb.); 6, the "*Perry*" (Post Oak × Herb.); 7, "*Vinita*" (also Post Oak × Herb.); 8, the "*Neva Munson*" (Neosho × Herb.), 9 and 10, the "*Black Herbemont*" and the "*Onderdonk*" (pure Herbemont Seedlings).

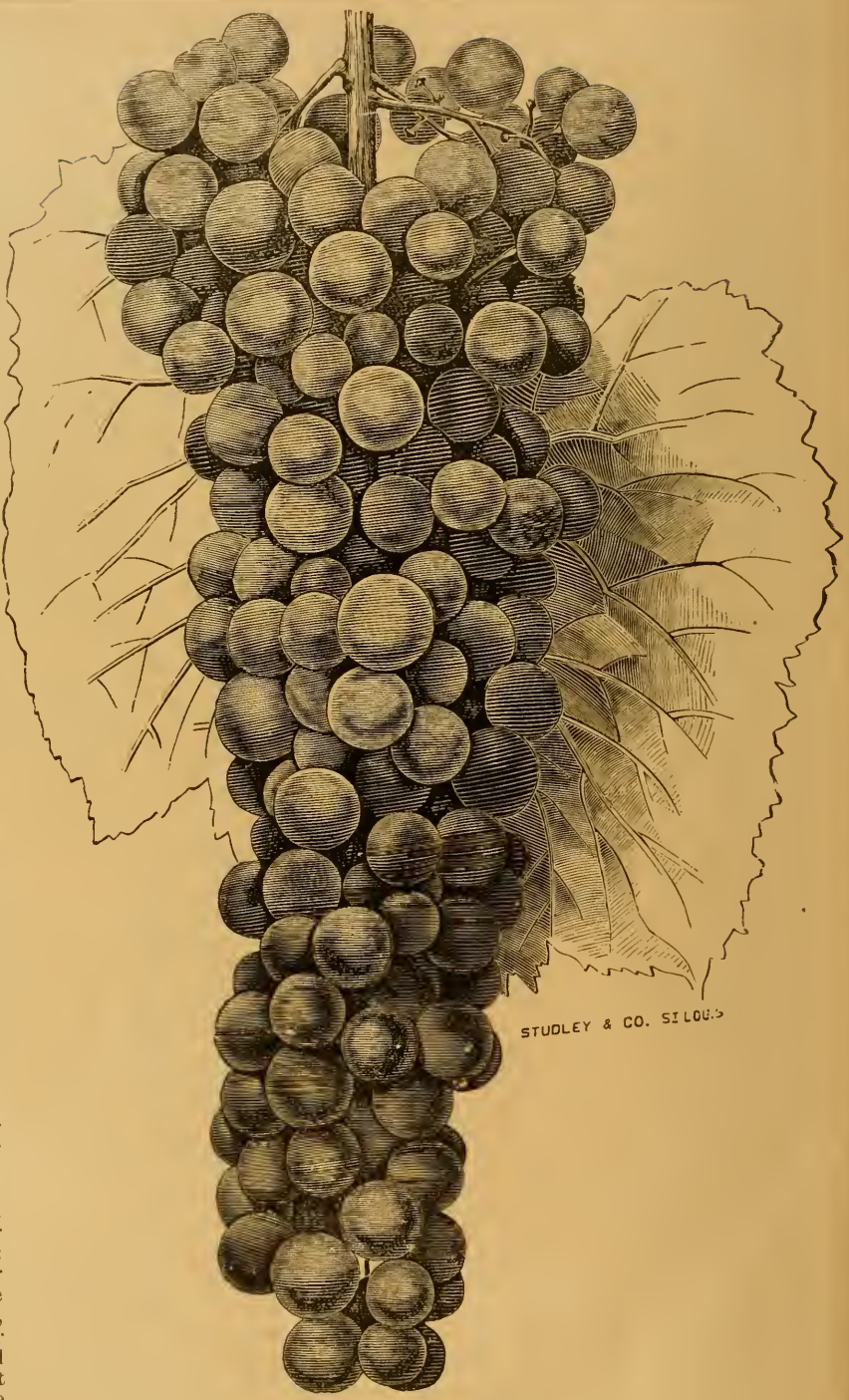
Herbert. (*Labr.-Hybr.*) Rogers' No. 44. A Mammoth Sage Seedling impregnated by Black Hamburg. This is probably *the best* of the black varieties of Rogers' hybrids, none proved of greater merit than this one. The vine is very vigorous, healthy, and hardy; *bunch* large, beautifully shouldered, rather long, and moderately compact; *berry* large size, round, sometimes a little flattened, BLACK; flesh very sweet and tender, purely flavored and free from coarseness or foxiness either as to the taste or smell. Early and productive.

Campbell says: "It has so many good qualities, it should be better known and more extensively planted both for home use and for a showy and excellent market grape. If I were asked to name another black grape, hybrid or native, that I consider equal in all respects to the *Herbert*, I could not do it!"

Hercules. (*Labr.-Hybr.*) A seedling from one of Rogers' Hybrids raised by the late G. A. Ensenberger, Bloomington, Ills. (Said to have been from a seed of a California grape, but undoubtedly from one of Rogers' Hybrids, as it possesses all the ear-marks of these, and none of the characteristics of Vinifera blood. *Starnes.*) The Vine is very vigorous and productive, developes very

large leaves as well as very large fruit. Bunch large to very large, sometimes shouldered, attractive in appearance, berry very large, round, BLACK with blue bloom; pulp rather juicy, not tender, and does not readily release the seeds; flavor good, cracks and drops badly sometimes; season about with Concord. A handsome amateur grape. It attracted much attention at the World's Columbian Exposition in Chicago (1893), owing to its very large berries, resembling well grown Black Hamburg. Size and appearance being more appreciated than quality.

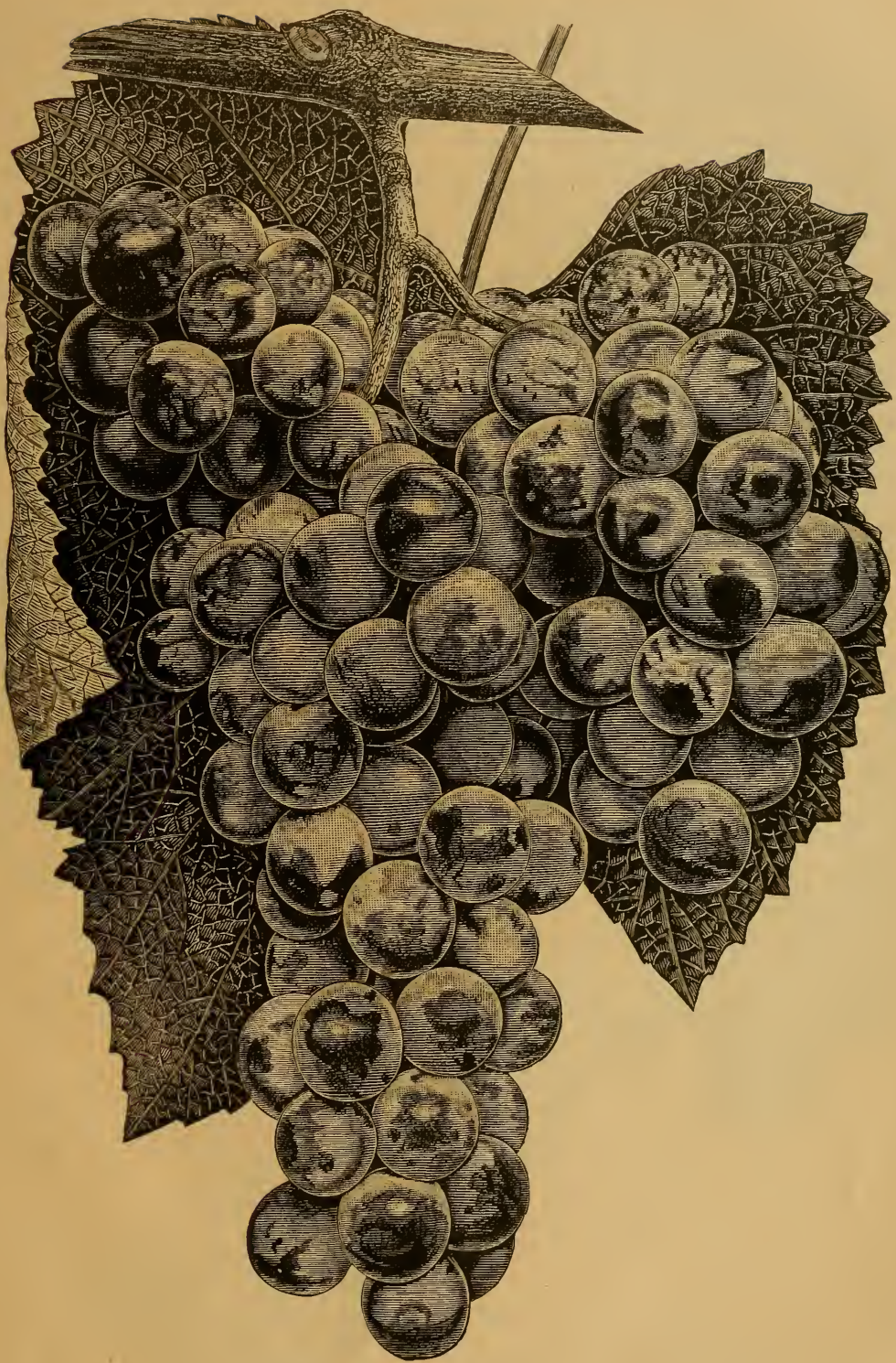
Hermann. (*Est.*) A seedling of Norton's, raised by F. Langendoerfer, of Hermann, Mo., in 1863. It has been fully tested in various places and proved well as to growth, foliage and fruit. On trying the must on Oechsle's scale it showed 94° to 105°. *Bunch* long and narrow, seldom shouldered, compact, often nine inches long; *berry* small, about same size as Norton's, round, BLACK with BLUE bloom, moderately juicy, rarely rots or mildews, and ripens very late, several days later than the Norton. The juice is of a brownish-yellow, making a wine of the color of Brown Sherry or Madeira, of great body, and of fine flavor; satisfactory in the South Central States. Our friend Sam. Miller says: "There is a peculiar fragrance about the wine of the Hermann, and, were I a teetotaler in drinking, I should like to have wine of it just for the pleasure of smelling it." The French judges at the Congrès Montpellier pronounce the Hermann "bien droit de goût, particulièrement bon et corsé."



THE HERMANN GRAPE.

Vine a strong grower and very productive, resembling the Norton's in foliage; but the leaves are of a lighter color, the stems covered with peculiar silvery-white hair-like threads, and the leaves somewhat more deeply lobed. It is, like its parent, very difficult to propagate from cuttings in the open ground. *Roots* wiry, very tough, with a smooth, hard, liber, defying all attacks of the Phylloxera. Canes of medium thickness, great length and vigor, and a moderate number

(Continued p. 138.)



HERMANN JAEGER. (Or Jaeger.)

of laterals; the canes often branch off with a fork, having a double bud at the base — a freak of more frequent occurrence with this, than any other variety we know of. Wood very hard with a small pith.

The Hermann was considered an important addition to our list of *wine grapes*. If productiveness, general hardihood and health, can entitle a variety to consideration, this variety certainly deserves it at the hands of our vintners. Its wine is entirely different and distinct from anything else we have; but the prediction "that it will produce a true American sherry, equal, if not superior, to anything the old world can produce," has proven idle talk and bombast. So far the *Hermann* has not grown in favor or popularity, and it will never be extensively planted.

For our locality and farther south it may be desirable, but farther north it will hardly attain the perfection requisite to make a superior wine, as it ripens so very late. It is specially adapted to southern slopes and limestone soil; a true Æstivalis in leaf and habit.

Langendoerfer has also raised *a white seedling of the Hermann*, which is very vigorous and productive, resembling its parent in growth, and in form of bunch and leaf. It was one of the *first* of that class (Æstivalis) with WHITE berries. The wine made from this variety is exceedingly smooth and fine, in bouquet, plainly showing Hermann origin.

The originator has not decided upon a name for this white grape, as the *very* small size and very late ripening of its berries would be unfavorable to its introduction.

Hermann Jaeger. (*Æst.* × *Linc.*) Produced by T. V. Munson, of Denison, Texas, in 1885, by crossing the Herbemont on a wild native grape (a Post Oak) of the species V. Lincecumii, found in his section of Texas. *Vine* exceedingly vigorous, very productive, hardy and healthy, may require winter protection. *Bunch* very large, compact, shouldered, sometimes double shouldered; *berry* medium, of DARK PURPLE color, almost black; covered with a rich bloom, adheres very persistently to the stem; *quality* very good; juice red, sweet and sprightly; pulp melting, skin thin and tough; *ripens* a few days later than Concord. An attractive and valuable grape. Regarded by Geo. W. Campbell as very promising, both for wine and table use. Illustration on page 137.

Hero. (*Labr.*) See Concord Seedlings p. 106.

Highland. (*Labr.-Hybr.*) One of the largest and finest looking of Ricketts' Seedling Grapes; a hybrid produced by fertilizing the Concord with Jura-Muscat; resembling the Concord in vine and foliage. A vigorous grower, with short-jointed, dark brown wood; large, thick, coarsely serrated leaves, and very productive. *Bunch* large, long, moderately compact and heavily shouldered; well-grown clusters sometimes weigh one pound. *Berry* large, round, BLACK, with an abundant blue bloom; flesh soft, slight pulp, juicy, sweet, slightly vinous. *A market grape.* Ripens late; fully as late as Catawba. Requires a favorable locality and a long season to mature. See Illustration on next page, 139.

Hine. (*Labr.*) A seedling of the Catawba, raised by Jason Brown (son of John Brown, the abolitionist), at Put-in-Bay, Ohio. It makes a good-sized, compact, slightly shouldered *bunch; berry* medium, of a dark rich CLARET BROWN, with a purplish bloom; skin of medium thickness; flesh juicy, sweet, and almost without pulp; leaf large, thick, and whitish underneath; canes reddish-brown, short-jointed; buds prominent. Ripens with the Delaware, which it somewhat resembles. It took the first premium as the best new seedling at the Ohio State Fair, 1868. We cannot recommend it except as an interesting grape to amateurs.

Holmes. (*Æst.* × *Labr.*) A chance seedling which appeared in a garden in Galveston, Texas. Onderdonk kindly furnished us with the following description of this grape for the Bushberg Catalogue: "The Holmes combines, in its growth and appearance, both *Æstivalis* and *Labrusca* blood. Its fruit is about the size and color of Lindley. I believe it to be a cross between the Southern Æstivalis of the Herbemont Division and a Labrusca, and that it will, possibly, combine the hardiness of our Æstivalis with the pulp of the Labrusca." The original vine is very productive and has been so for many years.

Honey. (*Labr.-Hybr.*) Originated by C. Engle, of Paw Paw, Mich., raised from seed of Salem (Rog. 53). Vine short-jointed, vigorous, hardy and very productive. Bunch medium, compact, shouldered; berry medium to large, WHITE, almost translucent, the seed being plainly visible from the outside. Of honeyed sweetness. To those liking a sweet grape it would be very fine; ripens early, with *Worden*.

Hopican. (*Rip.-Hybr.*) Originated by D. S. Marvin, of Watertown, crossing Eumelan with Elvira. Bunch medium to large, compact, slightly shouldered; berry medium, PALE GREEN with white bloom; pulp tender, separating readily from the seeds, with good flavor but neither very sweet nor very juicy; skin thin; season of ripening with Concord.

Hopkins. (*Linc.* × *Æst.*) See Munson's Seedlings.

Hosford. (*Labr.*) Probably a seedling from Concord grown by Geo. Hosford, Ionia, Mich. Vine a vigorous grower, healthy, hardy and prolific; bunch large, tapering; berries large, BLACK with delicate bloom: pulp tender, juicy, sweet; flavor pure, not foxy; ripens a few days earlier than Concord. (Ignored at the Michigan Experiment Station even!)

Howell. (*Labr.*) Origin unknown. *Bunch* and *berry* medium; oval, BLACK; skin thick; flesh with firm pulp, pleasant. Good. Middle of September.—*Downing.*

Huber's Seedlings. Theophile Huber, at Rock Island, Ill., an amateur grape-grower, sent us in 1883 a number of new grapes, of fair quality, said to be perfectly hardy and good bearers; he named them Margerith, Illinois City and Braendly, q. v., and raised some more since; purely for his pleasure;—a labor of love.

Hudson. (*Labr.* ×) A seedling of Rebecca crossed with Clinton, raised by the late A. J. Caywood, he expecting to produce a grape which would combine the fine quality of the tender mother with the vigor of the rank grower of the Riparia species; but it did not result in the amelioration of either; being a WHITE grape neither very luscious nor very hardy and productive.

Humboldt. (*Rip.* × ?) An interesting seedling of the Louisiana, raised by Fr. Muench, who observed himself that it has no resemblance to Louisiana; it has much more of the Riparia character, and most probably is an accidental cross between a Louisiana and some belated Riparia blossom. *Vine* of very vigorous growth, healthy and hardy, free from rot or leaf blight; *bunch* below medium; *berries* medium, of light GREEN color, changing to a rose tint, when fully ripe. It is sufficiently productive and of fine quality in some localities.

HIGHLAND.

Huntingdon. (*Rip.*) A grape of the Clinton class. *Bunch* small, compact, shouldered; *berry* small, round, BLACK, juicy and vinous. Ripens early. Vine a vigorous grower, healthy, hardy and productive, but unworthy of propagation.

Hyde's Eliza. See "York Madeira."

Ida. (*Labr.*) See T. B. Miner's Seedling.

Ideal. (*Est.* ×) Originated by *John Burr*, of Leavenworth, Kan., from Delaware. (See remark on seedlings of this variety, page 114.) Vine vigorous, hardy and very productive; overbears, sometimes subject to rot and mildew. (It never rotted nor mildewed on Mr. Burr's place, but it has with Dr. J. Stayman, near by.) *Bunch* large, shouldered, compact, very handsome; *berry* large, RED, with slight bloom; flesh tender, juicy, sprightly, vinous, rich, sweet; quality best, almost equal to some European grape; skin thin but tough; without pulp when fully ripe and melting; flavor very delicate; an ideal grape. Ripens about same time as Delaware, is of about the same color, but fully double its size.

Friend Sam. Miller, says of the "Ideal:" Red as a ruby and perfection to my taste.

Illinois City. (*Labr.*) Raised at Illinois City by Theophile Huber; a WHITE grape. Similar to his Marie Louise (see descr.), but sweeter, juicier and of higher flavor. Tested by Prof. J. L. Budd, Iowa Agricultural Col., and recommended in the Iowa State Register of Sept., 1887.

Imperial. (*Labr.-Hybr.*) A white seedling from Iona and Sarbelle-Muscat, by Ricketts, of Newburgh, N. Y. *Bunch* large with slight shoulder; *berry* very large, WHITE with considerable bloom; no pulp; no seeds(?); splendid flavor with traces of the Iona-Muscat aroma. Vine a vigorous grower, hardy; ripens about time of the Isabella. The finest white grape of Ricketts' collection, according to Williams, editor *Horticulturist*.

Imperial. (*Labr.* ×) Said to be a seedling of the *Hayes* grape with an admixture of foreign blood, quite perceptible in the character of its fruit. Vine subject to mildew. Bunch and berry medium to large; WHITE with a pinkish or lilac colored bloom; rich and juicy, with the aroma of a hot-house grape. Does not ripen fully in northern locations. Another duplicate name.

International. (*Rip.-Hybr.*) See *N. B. White's* Hybrids; sub. W.

Iola. (*Riparia.* ×) Originated by John Burr, of Leavenworth, Kan., produced from mixed seed. The vine is vigorous, hardy and productive; was ever free from rot and mildew on Mr. Burr's ground. Bunch medium, compact; berry medium, WHITE, tender, juicy, sweet, vinous; quality very good. Ripens with Concord.

Iona. (*Labr.*) Originated by the late Dr. C. W. Grant, of Iona Island, N. Y. It is a seedling of the Diana, and the leaf somewhat resembles that variety. Wood soft, short-jointed, with a pith above average size; vine a strong grower, but not very hardy; *roots* very few, straight, of medium thickness, and of no very firm texture. Canes straight, not inclined to ramble, and of medium thickness, with few laterals. Here it is subject to mildew and rot, and requires careful protection in winter, and yet the *Iona* was successfully grown for a time as far north as Traverse City, Mich.! But with most growers it has proved a sad failure.

The Iona is a fine grape for the garden, and suited only to specially sheltered and protected localities; it requires rich soil and good cultivation; in regions not subject to mildew the Iona will, in favorable seasons, yield a fine crop of large, splendid and well-developed clusters, especially when trained against buildings. We are sorry to know that in open-field culture it does not ripen uniformly, and in some years entirely fails in most localities. Wherever it will succeed it is the finest of American grapes in flavor, a most desirable variety, also for the vineyard.

Bunch usually large, long, and shouldered, not very compact; *berries* medium to large, slightly oval; skin thin, but tenacious; pale RED, with numerous deep red veins, which become quite dark when fully ripe; fine bloom. Flesh tender, with uniform character and consistence to the centre. Flavor rich, sweet, vinous; quality BEST, equalling the Delaware. Ripens a few days after Concord, continues a long time in use, and does not deteriorate in keeping as most other grapes will; with proper care it can be kept until spring, and still be good. Requires short pruning and must not be allowed to overbear. Magnificent specimens were grown in a cold-house by Wm. Saunders, at the Experimental Gardens at Washington. *Must* 88° to 100°, acid $6\frac{6}{10}$.

Iowa-Excelsior. (*Labr.-Hybr.*) Raised by Prof. Mathews, of Iowa. Sam. Miller describes it to us as "a LARGE RED grape, fair-sized bunch, ripens before Concord, and to my taste as good as Rogers No. 15 (Agawam), which it slightly resembles." This grape might become valuable for the West, and we are surprised that no effort has been made to introduce it.

Iris. (*Hybr.*) Originated by C. Engle of Paw Paw, Michigan. In reporting to us his best he omitted this, as probably, not satisfactory to himself, or not sufficiently tested.

Ironclad. (*Riparia* × *Labr.*) Syn., PEARSON'S IRONCLAD, ASH grape, SCOTT grape, DIOGENES (supposed to be a native *Riparia*). This interesting little grape was known to old settlers around Darby, Pa., one hundred years ago, as the "Ash Grape," growing on the farm of Mrs. Ash, the grandmother of Col. A. W. Pearson. The people around Darby resorted to this vine for its abundant fruit to make jellies, etc. In 1872 Mr. Pearson propagated plants from cuttings of this vine and named it the "SCOTT" grape, in honor of Col. Scott of the Pennsylvania R. R. When grape-rot devasted the vineyards of New Jersey, while this grape did *not rot*, public attention was called to it and its name was changed to "IRONCLAD." A few vines, apparently of the same kind, were planted in 1865 at Egg Harbor City; coming from "Wilson's Nursery" through Mr. Landis, the founder of "Vineland," who—desiring to give the place that name—ordered six grape vines to be planted on each farm he sold; these six vines were two of Catawba, two of Isabella, and two of this (Ironclad), there named "Diogenes." They were generally extirpated, as their fruit was disappointing in quality for a market grape; but as a wine grape, free from rot, it certainly deserved planting.

Vine of exuberant rapid growth which does not stop until freezing weather, so that late autumn shoots do not ripen; it blossoms fully ten days earlier than Concord. *Foliage* abundant, but prone to attack of the Downey mildew. Many of its leaves are shed as the fruit is ripening. This

is fully ripened about 10 to 15 days after Concord. It has the peculiarity of the *Ives*, coloring long before ripening. *Bunches* small; in some seasons compact and perfect, in other years showing many undeveloped berries. *Berries* small, BLACK, pulpy, of good flavor, not foxy; good to eat, but not attractive enough in appearance to be of value as a market grape. Valuable as a *wine* grape on account of its remarkable color—a rich *purple*, dense and durable (so that it has been used as an almost indellible ink). The Ironclad is erratic in fruiting, sometime setting full clusters, three to five on one lateral, at other times few and very defective. It fruits best when the vine is but little pruned, the canes being allowed to extend themselves and then pruned to spurs. Young vines make but slow growth for two years after planting, but when they get well rooted are almost irrepressible. Although its foliage suffers from the Downey mildew, this does not attack the grapes, which are never affected by rot, but are, of wet seasons, injured by anthracnose.

Irving. (*Labr.-Hybr.*) Underhill's 8–20. A fine, showy and attractive white grape, grown from Concord seed crossed with White Frontignan, which was planted by Stephen W. Underhill, of Croton Point, N. Y.; fruited first in 1866.

The character of the very large cluster is seen by the engraving (about one-third reduced in size). The berry is large, considerably larger than Concord, of a YELLOWISH-WHITE color, slightly tinged with PINK when very ripe. The vine is a moderately vigorous grower; has large, thick foliage, with "down" on the under-side. Fruit ripens rather late, between the Isabella and Catawba, and keeps well in winter; it has a vinous flavor, and is quite fleshy when perfectly ripe. Proves quite satisfactory in some localities. We consider the Irving more deserving of dissemination than his "Croton."

IRVING.

Irvin's October. (*Labr.*) Originated on the old Irvin farm in Guilford Co., N. C. It is valuable only in the South, on account of its lateness, where all our best grapes ripen in July and August. It has long, pendant, large shouldered bunches, with medium berries, of a dingy red color, sweet and good. It would be worthless in the North.

Isabella. (*Labrusca.*) Syn., PAIGN'S ISABELLA, WOODWARD, CHRISTIE'S IMPROVED ISABELLA, PAYNE'S EARLY, SANBORTON(?). Probably a native of South Carolina. About the year 1816 it was brought to the north and introduced to the notice of cultivators by Wm. Prince, who obtained it from Mrs. Isabella Gibbs, in honor of whom it was named. In the East its great vigor, hardiness and productiveness have caused it to be widely disseminated, but in the West it was found to ripen unevenly, and to be very liable to mildew, rot and leaf-blight. It has justly, we think, been discarded by our Western grape-growers since better and more reliable varieties have taken its place. *Bunches* large, loose, shouldered; *berries* oval, large, DARK PURPLE, nearly BLACK when fully ripe, and covered with a blue-black bloom. Flesh juicy, with a rich, musky aroma; tough pulp, and a great deal of acidity. Ripens irregularly, and the leaves seem to fall just at the time when they are needed to aid in ripening the fruit.

In *some* localities it is still a favorite market grape. Must at Hammondsport 60°–79°; acid 12½ to 8 per m.

The *Isabella* has a host of children, few of whom, it seems, have survived her. Those of her seedlings which acquired some repute are described under their proper names in this Catalogue—see *Adirondac, Eureka, Hyde's Eliza, Isabella Seedling by Ensenberger, Israella, Mary Ann, To-Kalon, Union Village.*

Many of her seedlings differ so little in form, size, or quality of fruit, in growth and productiveness (some differ only in name), that we prefer to class them as sub-varieties. They are *Aiken, Baker, Bogue's Eureka, Brown, Cloanthe, Carter, Hudson, Kendall, Louisa, Lee's Isabella, Nonantum, Payne's Early, Pioneer, Sanbornton, Trowbridge, Wright's Isabella, &c.*

Isabella Regia. See Pierce.

Isabella Seedling. (*Labr.*) Produced by the late G. A. Ensenberger, of Bloomington, Ills. Vine vigorous and productive, foliage good; fruit resembles *Isabella* in many respects, but is earlier; about two days later than Moore's Early, and has a more compact cluster than its parent.

Israella. (*Labr.*) Originated with Dr. C. W. Grant, who claimed for it that it was "the earliest good grape in cultivation"; but later he himself admitted that it was not as good as his "Eumelan." With us it proved later than Hartford. Vine a moderate grower; foliage subject to mildew; *bunches* large, shouldered, compact, and *very* handsome when well ripened; *berry* BLACK with beautiful bloom, rather large, slightly oval, pulpy, not above second-rate in quality. It is now generally discarded.

The Israella is probably a seedling of the Isabella, which it resembles in habit of growth and character of fruit.

Ithaca. (*Est.-Hybr.*) Raised by Dr. S. J. Parker, Ithaca, N. Y.; described by its originator as larger than Walter in bunch and berry; a pure GREENISH-YE LOW: a rose-like smell, a high, Chasselas-Musque-like flavor, and claimed to be a cross of Chasselas on Delaware, ripening before Delaware. Said to be hardy, healthy and vigorous.

THE IVES GRAPE.

Ives. (*Labr.*) Syn., IVES' SEEDLING, IVES' MADEIRA, KITTREDGE. Raised by Henry Ives, of Cincinnati, Hamilton Co., Ohio, (probably from the seed of a Hartford, certainly not from a foreign grape as supposed). Col. Waring and Dr. Kittredge were the first to make wine from it—about 1865—and now it is a popular RED wine. While we do *not* deem it entitled to the first prize "as the best wine-grape for this country" (awarded to the Ives at Cincinnati, in 1868), we do accord to it the merit of having given a new impulse to grape-growing in Ohio, at a time when the repeated failures of the Catawba vineyards made it most desirable that a more reliable and productive grape should be introduced.

Bunches medium to large, compact, often shouldered; *berries* medium, slightly oblong, of a dark PURPLE color, quite BLACK when fully ripe. Flesh sweet and juicy when ripe, but decidedly foxy, and rather pulpy. Not desirable as a table grape, being of poor quality, but nevertheless a popular market grape, as it bears transportation better than most other (early) kinds.

It colors very early, long before it is ripe and fit for use; its period of ripening is in fact later than the Concord. The vine is remarkably healthy and hardy; generally exempt from mildew and rot; a strong, coarse grower, in general habit resembling the Hartford. *Roots* abundant, thick-spreading, and of tolerably hard texture. Liber thick but firm; pushes new spongioles rapidly and offers good resistance to the Phylloxera; it nevertheless did not succeed at all in southern France, while in this country, it takes the lead in North Carolina, in the S. E., as well as in Iowa, in the N. W., and is very popular as a wine grape. It is not an *early* bearer, four-year old vines of this variety producing the first crop; it bears profusely when older. The Ives wine has a most beautiful deep red color, but a foxy taste and odor in the beginning which, however, improves soon. Must 80°.

Jacques. Syn., JACK, BLACK SPANISH, (OHIO, CIGAR BOX, &c.) See Lenoir.

Jaeger. (*Linc.* ×) See Hermann Jaeger, pp. 137–138.

Jaeger's Selected Æstivalis Seedlings and Crossings. About a quarter of a century ago (in 1868) Hermann Jaeger, of Neosho, Newton Co., Mo., commenced making selections of the best Æstivalis grapes growing wild in Southwest Missouri, Arkansas and Indian Territory. He sent grafts of a number of these to that venerable pioneer of Missouri grape-growers, the late Frederick Muench, who thought so much of two of them that he named one "Neosho" and the other "Far West." (See descr. pp. 161 and 127.) Hermann Jaeger continued selecting and cultivating

the wild Æstivalis of Lincecumii-type, popularly called Post-Oak grapes in Texas (also known in Europe as Æstivalis Jaeger). His aim was to obtain, through selection and growing of seedlings a race of grapes better fit to resist the extremes of our Continental climate, as well as the terrible pest of black rot, than any heretofore cultivated. Many were his disappointments, due to imperfect fruiting outside of their native woods, when grown in gardens, where not mingled with male plants. One, however, a Post-Oak grape (No. 43, see figure p. 26), of Concord size, with larger and more compact bunches than Concord, and free from rot, proved so much superior that Mr. Jaeger used it almost exclusively to cross with other species of grape vines; it is hardly fine enough to be recommended for table use, but its vigor, freedom from rot, resistance to drouth, heat and cold, large clusters and berries render it eminently fit for hibridization.*

To his three best (Nos. 70, 50 and 56) he gave names: "*Munson*" (see descr.), "*Longworth*" and "*Dufour*" (descr. p. 117). Among his others, not yet named, ELVIRA SEEDLING No. 100 is considered quite desirable as a fine very early table grape, but owing to liability to crack open it can be recommended only for home use. It resembles the *Perkins* in color, size of bunch and berries, though rather larger; it is juicier, sprightlier, and less foxy than any pure Labrusca, otherwise the most Labrusca-like in vine and fruit.

James. (*Rotund.*) See Scuppernong.

Janesville. (*Labr.*×*Rip.*) By some supposed to be a cross of Hartford and Clinton. An early BLACK grape, largely planted in Iowa and Wisconsin, but further south now generally discarded for better varieties. *Vine* a vigorous grower, hardy, healthy, and productive; *bunch* medium, short and compact; *berry* medium to large, BLACK; skin thick; flesh pulpy; quite acid; quality about like Hartford; colors even earlier than this variety, but fully ripe at about same time.

*M. Marès, a distinguished member of the French Phylloxera Commission, reports that among his Rupestris he found one which the third season produced 1 kilo. grapes, of magnificent color, ripe on the 2d of August, the must of which had an excellent taste, weighing 11° Beaumé (83° Oechsle) scale, and made a very good wine. This variety may become the starting-point for many interesting seedlings or hybrids; it is of remarkably vigorous growth and unharmed by Phylloxera. The fibrous roots of the Rupestris are long and strong, and defy drought even in less than ordinary soils.

Speaking of the improvement of the American grapes which may be produced by crossing the finer foreign Varieties upon the most rugged and hardy of our natives, Geo. W. Campbell, said: I have in my mind an experiment in crossing the West's St. Peters, a large, late and excellent BLACK foreign grape, upon the Janesville, a small grape, also BLACK, which is one of the hardiest, earliest and poorest of our native varieties. The result is a vine bearing heavy clusters of large, oval berries, resembling in size and appearance the foreign parent, ripening medium early and in quality very nearly equal to it. In the fruit all trace of the Janesville has disappeared. The vine and foliage, however, appear intermediate between the two. I do not expect the vine to be as hardy and the foliage not as healthy as that of the Janesville, and it will require some winter protection where the temperature falls much below zero.

Jefferson. (*Labr.* ×) This handsome and excellent red grape, was raised by James H. Ricketts, Newburgh, N. Y. It is a cross between the Concord and Iona. The foliage is strong and healthy, not liable to mildew; the vine is vigorous in growth, hardy, and bearing well; wood rather short-jointed: leaves large, thick and downy.

Bunch large, shouldered, sometimes double-shouldered, compact: *berry* above medium, roundish-oval; skin rather thick: LIGHT RED with a thin lilac bloom: flesh meaty yet tender, juicy, sweet, slightly vinous, aromatic. The berries adhere strongly to the peduncle, and the fruit maintains its freshness long after being gathered. It is of fine quality: clusters large, handsome, closely resembling the Iona, which variety it also equals in quality and flavor. The annexed illustration shows the form of the bunch, considerably reduced in size.

JEFFERSON. Reduced ⅓.

Where climate and seasons are favorable to its development it is one of the finest red grapes, either for market or home use, and would make a superior wine. It ripens about two weeks after the Concord. Its beauty and high

character make it a valuable late variety. The late M. P. Wilder, as President of the Am. Pomol. Society, session of 1881, said: "The Jefferson of Ricketts might with propriety be denominated and may yet be distinguished as the Muscat of America." Campbell, of Ohio, wrote in his paper on the "*Improvement of our native Grapes by Crossing*," "Concord and Iona are said to be the progenitors of this grape, which has all the beauty, and I think more than the excellence, of the charming Iona. *If* we really have the *Iona* grape upon a Concord vine, it is an achievement whose value can hardly be overestimated." [See remarks on Ricketts' grapes, sub. R.]

Jemina. (*Rip.* ×) Produced by D. S. Marvin, Watertown, N. Y., from seed of Elvira crossed with an unknown grape, which carries it further towards V. Riparia. Vine vigorous, healthy and hardy, so far free from mildew; in fruit since 1891. A delicious BLACK grape, ripens much earlier than Elvira; bunch short, compact; berry medium; skin thin, liable to burst; take half the berries from the cluster and let it hang a long time after coloring to get best results; worthy of trial for family use.

Jennie May. (*Labr.*) See Concord Seedling, p. 106.

Jessica. (*Vin. ?*) Introduced by D. W. Beadle, of St. Catherines, Ontario, Canada. One of the earliest of the WHITE grapes. Vine medium strong in growth, somewhat inclined to mildew; *bunch* small, about the size of Delaware; *berries* somewhat larger, color WHITE to GOLDEN YELLOW; flavor very sweet; seeds large for the size of the berry; skin thin when fully ripe; some consider its quality good, others pulpy, foxy, inferior; recommended for home use in Northern sections.

Jewel. (*Æst.* ×.) Originated about 1874 by John Burr, of Leavenworth, Kan., from Delaware. (See remark under Early Victor, p. 121.) First offered for sale in 1887 by Stayman & Black. Vine not very vigorous until well established; hardy and healthy but not always productive, as it is of the character of Moyer and Brigbton (stamens with curved filaments), requires fertilization and should be planted with others that bloom at the same time. *Bunch* medium to small, shouldered, compact; *berry* BLACK, medium, larger than Delaware; skin tough; pulp rather tender, sweet, juicy, sprightly vinous, BEST; not disposed to rot and mildew; ripe before Hartford, earlier than Delaware and equal to it in quality; will hang on the vine long after ripening and ship well. Has been free from rot and mildew, so far, wherever tested.

President Evans, of the Missouri State Horticultural Society, says: "The Jewel is the coming grape for early market." Geo. W. Campbell, Delaware, Ohio, a most reliable judge, reported in August, 1888: "The *Jewel* has made a moderate, healthy, growth and is bearing well. So far the foliage has been free from mildew and the fruit from rot, even in unfavorable seasons, when other kinds have been attacked. It is among the *earliest* to ripen. The vine is hardy here in quite severe winters, without protection."

Jumbo. (*Labr.*) Grown by Mrs. R. Rose, Marlboro, N. Y. Probably a Concord Seedling, vigorous, hardy and productive of bunches fully one pound in weight, with very large berries, almost the size of small blue plums; color BLACK with fine blue bloom; quality good; ripens with Concord, sometimes a little earlier. A good market grape.

Juno. (*Labr.-Hybr.*) Syn., UNO. A cross of Muscat-Hamburg and Belvidere, produced by George W. Campbell, of Delaware, Ohio (about 1882), of great beauty and excellence; it seemed to us a most valuable addition to our fine table grapes; but after several years' trial our friend Campbell himself thought it not hardy enough in severe winters and its foliage not healthy enough for general culture; and—conscientuous as he is—did not regard it up to the standard which he had fixed for his own grapes to be worthy of his recommendation.

Juno. (*Æst.-Hybr.*) Originated by the late G. A. Ensenberger, of Bloomington, Ills., from seed of Delaware, in 1888. The vine seemed a vigorous grower and productive of an early white grape; medium bunches, sometimes slightly shouldered; the berry also medium size, WHITE, translucent, with yellowish tinge, but somewhat foxy taste, yet good in quality and flavor, the pulp separating readily from the seeds. The fruit kept in good condition till December. [Tested at the New York Experiment Station.]

Kalamazoo. (*Labr.*) Raised from seed of Catawba by a Mr. Dixon, an Englishman, at Steubenville, Ohio. The fruit is larger than the Catawba, and grows in bunches larger than those of that variety, and more marked in the peculiar richness of its deep BLUE bloom; skin thick; flesh soft, not quite tender all through; sweet, but not as rich as Catawba. According to the Amer. Pomological Society Report (1871), it is said to ripen ten days earlier, and according to the Department of Agriculture Report, 1872 (p. 484), it is said to ripen ten days later than the Catawba! We do not know which is correct, as we did not try this variety ourselves. The vine is said to be a vigorous grower, hardy and very productive.

Kalista. (*Æst.* ×) See Delaware Seedl., p. 114.

Kay's Seedling. (*Æst.*) See Herbemont.

Keller's White. (*Labr.*) See Catawba Seedling.

Kendall. (*Labr.*) See Isabella Seedlings, p. 141.

Kensington. (*Rip.-Hybr.*) Produced by Wm. Saunders, at London, Ont., who pollenized Clinton with Buckland's Sweetwater. This variety combines in fruit and vine the characteristics of both parents. Vine fairly vigorous; wood short-jointed; leaves deeply cut; bunch medium; berry medium size, oval, WHITE; skin thin; pulp rich and juicy; a grape of first quality, ripening with or a little before Concord. Probably valuable for home use.

Kentucky. (*Æst.*) Supposed seedling of Norton's Va., found 1887, by James Childers, of Auburn, Ky., in his graden. Vine vigorous, hardy, healthy and prolific. Tips of growing canes reddish, which is characteristic of its species; (vide Engelmann's classification) it has large and perfectly healthy foliage; long, intermittent tendrils; stamens slightly reflexed; *clusters* large, often very large, double shouldered, resembling in general outline bunches of the Herbemont, but in other respects more like its supposed (undoubted) parent; berries medium, BLACK, with much color: small seeds; quality very good; ripens about the same time with the Nortons. G. W. Campbell, to whom Childers sent specimens of this grape in the Fall of 1890, says, it impressed me very favorably; is *very good*, rich, with much color; very promising, both for table and wine; Hon. W. L. Dulany, ex-president Kentucky State Hort. Society, sent him, and to us also, vines of the "Kentucky" for testing; they are growing well and we are watching its development with much interest. We think it will be worthy of extensive trial, but *no* vines of it will be for sale for a year or two, and then only if it fulfills its early promise.

Keystone. (*Labr.*) See Concord Seedl., page 106.

Kilvington (?). Origin unknown. *Bunch* medium, tolerably compact; *berry* small, round, DARK RED with a bloom; flesh pulpy, half tender, vinous.—*Downing.*

Kingsessing. (*Labr.*) *Bunch* long, loose, shouldered; *berry* medium, round, PALE RED with a bloom; flesh pulpy.—*Downing.*

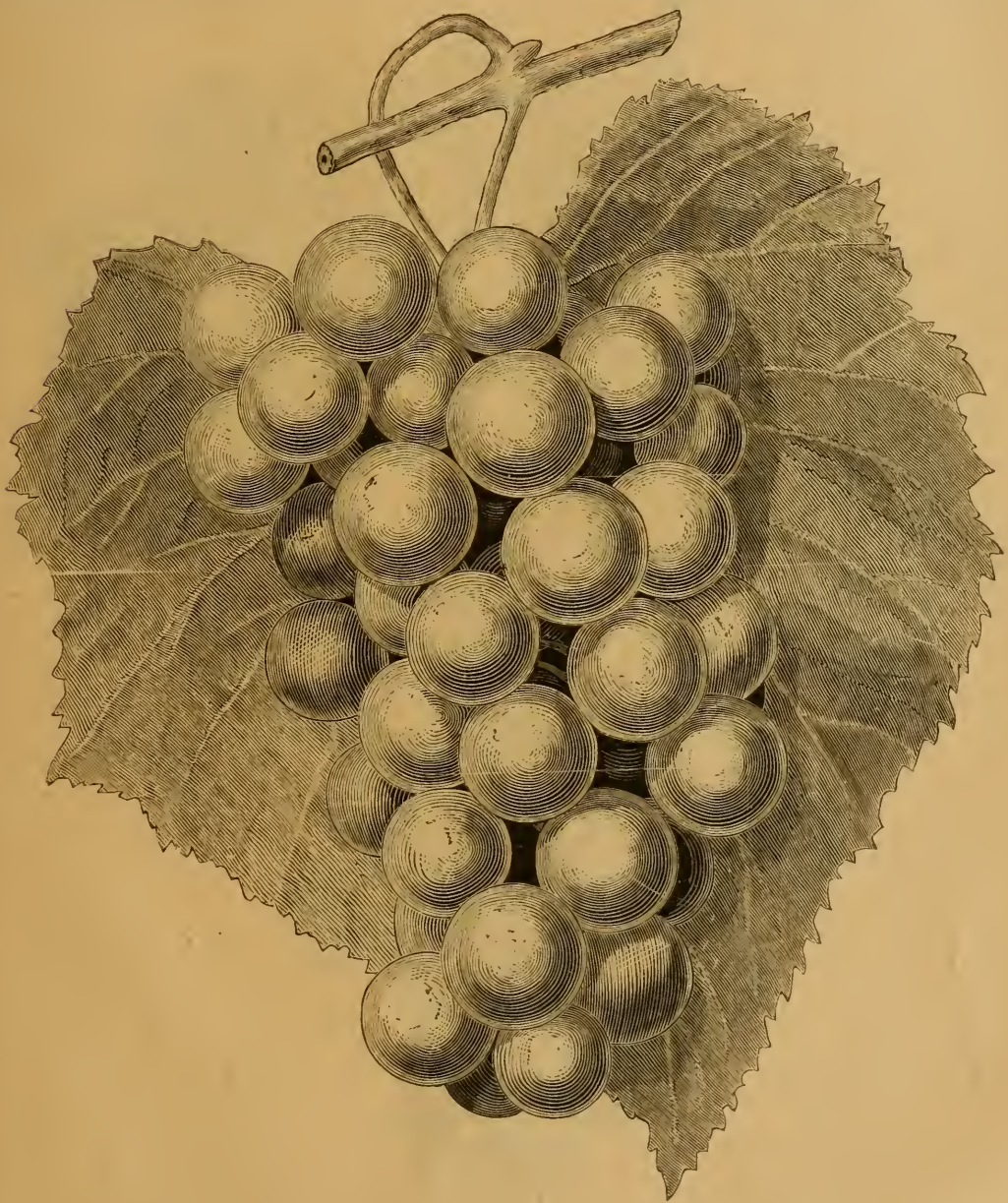
Kitchen. (*Rip.*) Seedling of Franklin; *bunch* and *berry* medium; *berry* round, BLACK; flesh acid, juicy.—*Downing.*

Labe (?). *Bunch* rather small, short, oblong; *berries* medium, loosely set, BLACK; flesh half tender, pulpy, sharp, sweet.—*Downing.*

Lacrissa or **Saccharissa.** (?) (*Est.* ×) See Delaware Seedling, page 114.

"Lady." (*Labr.*) One of the best early white grapes, was purchased by Geo. W. Campbell from a Mr. Imlay, of Muskingum County, Ohio; first offered to the public in the fall of 1874, and now deservedly popular and planted quite largely for family use and for *near* markets. It is unsuited for distant shipping and rough handling.

It is a pure Concord seedling, and has almost the vigor, health and hardiness of its parent; is like it free from mildew, but subject to rot. The vine, in its habit of growth,



"LADY."

foliage, and general appearance, is similar to Concord, requires a good fertile soil to bear well, but will overbear if not thinned. It is unquestionably an improvement on the Martha grape, being larger in size, earlier, and better in quality, having less of that foxiness which renders the Martha so objectionable to many. It succeeds in localities where the Concord can be grown with good success and seems growing in public estimation; it is heartily recommended even as far North as the Province of Ontario, Canada. By reason of its early ripening it is specially adapted to northern localities where Concord does not always mature. The vines endure without injury severe cold winters. In size of cluster, rather small. In quality it is better flavored and more delicate than Concord. In

LADY WASHINGTON.

color, light GREENISH-YELLOW, covered with white bloom. Seed few and small; skin thin; pulp tender; flavor sweet, slightly vinous, and the foxy aroma of its class considerably chastened down. Although extra early in ripening, it is late in starting its buds in spring, and thereby escapes the evil effects of late spring frosts.

Lady Charlotte. (*Æst.* × *Labr.*) This WHITE grape was raised by Pringle, of Vermont, in 1869, from the Delaware fertilized by the Iona. It is described by the originator as follows: "Color LIGHT GREEN, becoming amber or golden, with a reddish tinge in the sun; *bunch* large, very broadly shouldered, narrow and pointed below, compact; *berry* of medium size, globular. Flesh with some pulp, but juicy and very sweet, without the least acidity in the centre or harshness or foxiness in its flavor. Vine a rampant grower and a great bearer, healthy; leaves very large, bearing much resemblance to those of the Iona. Time of maturity about with the Iona."

Lady Dunlap. One of Ricketts' Seedlings, first exhibited in 1881. Berry medium, AMBER, vinous, quality very good. (*Report on New Fruits*, Amer. Pom. Society, 1881.) See Ricketts' Hybrids.

Lady Helene. (Undetermined.) Originated by Fred Roenbeck, of Bergen, N. J. Vine a good grower and prolific; cluster large, shouldered, compact; berry large, WHITE, quality fair; ripens late, after Concord.

Lady Washington. (*Labr.-Hybr.*) One of Ricketts' choicest seedlings (¼ foreign), produced by crossing Concord (*f*) with Allen's hybrid (*m*). *Vine* a rank grower, very vigorous, short-jointed; *leaves* large, roundish, coarsely serrated, occasionally lobed, thick and downy, luxuriant and healthy, but inclined to mildew *Bunches* large, shouldered, often double-shouldered, moderately compact; *berries* fully medium in size, round; *skin* PALE AMBER, yellowish with a delicate rosy tint where exposed to the sun, having a thin whitish bloom; *flesh* tender, juicy, sweet, of very good quality and delicate aroma. The berries adhere well to the peduncle, and the fruit continues a long time in use. Ripens usually soon after Concord. A most beautiful variety. Requires a good gardener's care and attention, favorable soil and location to produce the very fine results of which it is capable. Succeeds by far better than most of Ricketts' fine grapes in some parts of Missouri and Illinois. In favorable seasons we and others raised bunches like the one shown in the illustration.

Lady Younglove. (*Labr.*×) Originated by John Sacksteder, of Leavenworth, Crawford county, Ind., a cross between Missouri Riesling and Perkins. Vine and root healthy, hardy and a heavy cropper, with vigorous, mildew resisting foliage; *bunch* medium, generally shouldered: *berry* above medium, oval, color GREENISH, light RED when ripe, season of ripening medium: best for table when turning from transparent green to pink; when over-ripe it gets the foxy Perkins flavor.

La Marie. (*Labr.*) A seedling of Willie, produced by L. C. Chisholm, of Spring Hill, Tenn. Vine of good strong growth, healthy and hardy; bunch and berries above medium; handsomly shouldered; color "ASHES OF ROSES;" an attractive market grape, ripens with Concord and will hang on vine much later; but while some seedlings from "Willie (q. v.) seem to be entirely free from its native aroma, La Marie returned to the strong foxy type of its grandparents; hence is used mostly for further improvement by hybridizing.

Laura.* (*Æst.* ×) Syn., WATERTOWN; a cross of Eumelan with Delaware. Originated by D. S. Marvin in 1880; but while at its home (Watertown) the clusters were emasculated, so that he dug it up, years ago; MUNSON, of Denison, Texas, to whom he sent it for testing, and who cultivated it since 1882, reports it of considerable value there, and Marvin refers us to him for its description, saying: "Munson knows more about LAURA than I do. He is a better grape botanist than I am, and has done much for grape culture. I am glad to learn that you consult him. We are good friends; he has aided me greatly, and I consider him and his work of great value." The following is the description friend Munson sends us, at our request:

The vine is similar in habit to the Delaware, having somewhat stronger growth, longer joints, but young wood, leaf stems and peduncles of clusters crimson; the leaves are generally three-lobed, as in Delaware, sometimes five-lobed and a little larger than in Delaware, and have the same or a slightly darker, lively tint of green, showing in this respect the character so well developed in the Herbemont. It flowers and ripens about with Delaware and has clusters of similar shape, except that they are longer and more conical. The best developed bunches are shouldered same as in Delaware; the *berries* are persistent of nearly same shape and size, averaging a little larger than Delaware. Color DARK PURPLE, when fully ripe *nearly black*, with delicate bloom; skin thin, tough, pulp tender, juicy, of excellent quality, about equal with Delaware; juice white; seeds one to three, small, similar in shape to those of Delaware. With me this variety has borne abundantly of compact, beautiful clusters. My vines stand surrounded by other perfect flowered varieties, blooming at same time, hence do not know whether it is fully self-fertilizing or not, yet I think it is, as it has hermaphrodite perfect flowers. As to its specific make up I am strongly of the opinion that it is a cross between *Eumelan* and *Delaware*.

Eumelan is certainly a hybrid between V. Labrusca and V. Vinfera, and *Delaware* between V. Æstivalis, V. Labrusca and V. Bourquiniana (some form of the so-called Southern Æstivalis). The *Laura* is more subject to black rot than Delaware, but less than Eumelan.

Laussel. (*Linc.* × *Gold Coin.*) See Munson's Hybrids, page 159.

Leader. (*Labr.*) Similar to Niagara; originated by B. F. Merriman, Ohio. Vine vigorous, healthy and productive; bunch not as large nor as compact as Niagara, of same color, WHITE, and native aroma.

Leavenworth. (*Labr.* ×) Originated in that city by Francis Godard, from Concord seed; the vine is vigorous, hardy and tolerably productive, free from mildew and not prone to rot. Bunch large, compact, handsome; berry large, WHITE, or DULL GREEN with thin bloom, very firm but not pulpy, sprightly, sweet, or nearly so; of agreeable flavor with some of the native aroma, which is pleasant; it resembles the Lady of our friend Campbell, not of as high quality, and ripens about the same time, fully one week before Concord, may require winter protection.

* Not "*Lama*"; no grape by that name exists; it was a typographical blunder, which escaped correction in our last edition. But it did not escape being copied in other "descriptive lists of our Native Grape," without questioning its correctness and, as usual, without giving us credit—for which we were thankful.

Lenoir. (*Est.*) Syn., Black Spanish, El Paso, Burgundy, Jack or Jacques. A southern grape of the Herbemont class, from Lenoir Co., N. C. *Bunch* medium to large, shouldered; under unfavorable circumstances, or on badly pruned, overloaded vines the bunches are loose and not shouldered; *berries* small, round, dark bluish-purple, nearly black, covered with light bloom; flesh tender, no pulp, juicy, sweet and vinous; very rich in coloring matter; a magnificent grape for the south, too tender and too late in ripening for the North and central States. In favorable localities desirable for wine and table. Vine a fine grower, but a tardy bearer; foliage deeply lobed.

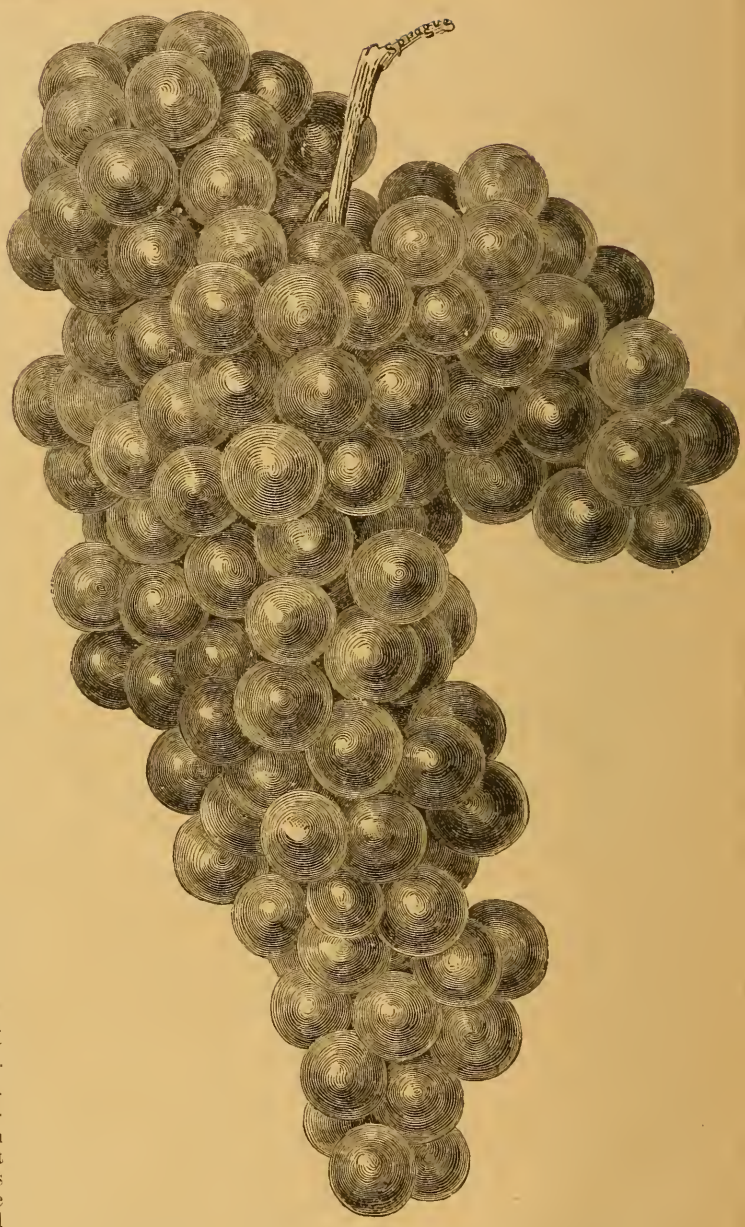
This variety is mainly cultivated in Texas under different names, as Black Spanish, El Paso. Many years ago (about 1859), some few vines, under the name of Jacques, were sent to France by Berckmans, of Georgia. In 1869 and following years, when the Phylloxera commenced to devastate the vineyards of southern France, these few Jacques vines continued in luxuriant growth and perfect health. This caused a great demand for Jacques vines, the more so as its grape, on account of its pure vinous taste and deep rich color, pleased the French *vignerons*.

But in vain did they apply to American grape-growers and nurseries for vines of this variety. Berckmans himself stated (in 1871) that he had none, and that the culture of this variety had been entirely abandoned in this country. No one then knew that the *Lenoir* and the *Black Spanish*, cultivated in Texas, were indentical with the *Jacques*.

After considerable research for this variety, we found that G. Onderdonk, describing in his Catalogue the *Lenoir*, made the following remark: "the leaf and habit exactly resemble those of the *Black Spanish*." From this remark, and from the description of the "*Ohio*" in *Downing's* "Fruits and Fruit-trees of America," we were strongly inclined to believe "Lenoir," "Black Spanish," "Ohio," "Jacques" indentical, and the very variety which our friends in France were looking for. We so declared in the second edition of our Catalogue (1874–5, p. 70), although even Berckmans and Onderdonk then considered them distinct varieties.

He had somehow got the idea that the Lenoir originated in Lenoir county, S. C., and wrote to Berckmans for further information who replied: "The Lenoir and Black Spanish are both native seedlings of the *Æstivalis* type; both have colored juice. The *Lenoir* has its bunches compact and shouldered; the *Black Spanish*, on the contrary, has the bunch very loose, cylindrical, growing to a length of 18 inches. Of the two, it makes the darkest colored wine. Both are, perhaps, the best red-wine grapes we have. * * * The Lenoir originated in South Carolina, the Black Spanish in Natchez, Miss."

But while we announced the indentity of these varieties as a *probability* only, a well-known French importer, less cautious and merely on the strength of *our* supposition, at once ordered thousands of cuttings from the Black Spanish, and offered them in France, at an exhorbitant



LENOIR. (Syn., Black Spanish, Jacques, etc.)

price, as the *Jacques*, claiming its discovery for himself. Hundreds of thousands of cuttings of this variety were then sent to France and planted there since 1876, and their success, their immunity from Phylloxera, productiveness, and quality, gave great satisfaction. The indentity of the *Jacques*, *Black Spanish* and *Lenoir* was there also fully established by Prof. Planchon, Pulliat, and other eminent ampelographs.

As this variety cannot be successfully grown in our vineyards on account of its non-resistance to mildew and to frost, we requested our friend Onderdonk to test and observe it, and he wrote us (August, 1883), "I am solid on the *Lenoir* matter now, and have at last become settled in the belief that Jacques, Lenoir and Black Spanish are indenticial *beyond doubt;* this variety is capable of very great variations under various special conditions."

In France, also, the success and especially the productiveness of the Jacques varies very much; in dry soils it yields far less wine, unless irrigation is resorted to. Of late years, the Jacques (as it is there still called) has suffered in some sections from the anthracnose. France has now more bearing-vines of this variety than can be found growing in the United States.

Some California grape-growers directed their attention to this remarkable grape, and planted thousands of the same variety, under its proper name "Lenoir." It succeeds there very well, and is much liked both on account of the fine dark color of its vinous juice and for its Phylloxera-resisting roots. This old, almost abandoned grape seems destined to become one of the leading varieties of both hemispheres. Even Prof. Viala, —who condemns all American grapes as of no value for France, excepting some few varieties, and these only as grafting stocks, — would not have them abandon the Jaquez in France; admitting it to be an abundant wine producer of value, and a better stock for grafting thereon than the Riparia, in certain French soils and localities.

The annexed engraving represents a medium sized bunch of the Lenoir, rather smaller than usual, especially *shorter*.

LINDLEY. (Rogers' No. 9.)

Lexington. (*Labr.*) See Miner's Seedl., p. 155.

Lightfoot. (*Labr.*) See Niagara, page 161.

Lincoln. (*Est.*) Syn., HART-GRAPE. Has been supposed to be identical with DEVEREUX, but J. F. Hoke, of Lincolnton, N. C., where it has been largely grown for many years, emphatically states that it is *not* the Devereux or Black-grape (Le Noir), but was formerly known as the Hart-grape. Sam. Miller, who got cuttings of this variety from Col. Hoke, tried it and reported that it is different from Devereux, and, to his taste, superior. We could not get a description sufficiently clear to distinguish it from Lenoir, of which see description and figure.

Linden. (*Labr.*) One of Miner's Seedlings (see page 155); a BLACK grape ripening several days before Concord, with very large bunches, which hang on the vine a month after ripening.

Lindherbe. (*Lindley* × *Herb.*) See Munson's Hybrids, page 159.

Lindley. (*Labr.-Hybr.*) Rogers' No. 9. This beautiful and valuable grape originated by hybridizing the wild Mammoth-grape of New England with the Golden Chasselas. *Bunch* medium, long, shouldered, somewhat loose; *berries* medium to large, round; color quite peculiar, and distinct from any other variety, rather more of a BRICK-RED than Catawba color; flesh tender, sweet, with scarcely a trace of pulp, possessing a peculiar, rich, aromatic flavor. Pres't Wilder denominated this and the *Jefferson* grape the *Muscats of America*. It resembles the Grizzly

Frontignan in appearance of bunch, and is regarded by some as fully equal to the Delaware in quality. The engraving represents a medium size bunch of this variety.

Roots long and straight, with a smooth liber of medium firmness; canes slender for their length, with few laterals, and large, prominent buds; *vine* of very vigorous growth, healthy and sometimes productive, making rather long-jointed wood, medium in hardness and size of pith. The foliage, when young, is of a reddish color; the fruit ripens very early, and keeps without extra care till the 1st of January. Specific gravity of must 80°.

We recommend it as a fine table grape — one of the BEST of the red Hybrids, but it should be planted near other varieties blooming at the same time to insure its perfect fertilization. See also *Mary*.

Logan. (*Labr.*) A wilding of Ohio. Supposed to be a great acquisition, on its introduction, and recommended by the Am. Pomological Society as promising well; but it has sadly failed to meet public expectation, and is now more generally discarded than the Isabella, to which it was deemed preferable. *Bunches* medium, shouldered, compact; *berries* large, oval, BLACK; flesh juicy, pulpy, insipid in flavor. Vine a slender grower, early and productive.

Long. (*Æst.*) See Cunningham, page 110.

Longworth. (*Linc.* × *Æst.*) Syn., Jaeger's No. 50, raised by Hermann Jaeger, of Neosho, Newton Co., Mo., a seedling of Post-Oak (No. 43) fertilized with Herbemont pollen. *Bunches* large with medium sized *berries* of BLUE-BLACK color; similar to Herbemont in quality. A promising very late market and wine grape. Starts growing much later in spring than other cultivated varieties; ripening two weeks after Norton and easily kept till Christmas. Adapted to the Southern, Southwestern and South Central States only; but with laying down in winter and spraying in spring this vine will fruit further north.

Louisa. (*Labr.*) See Isabella, page 141.

Louisiana. (*Æst.*) Introduced here by that eminent pioneer of Western grape culture, Frederick Münch, of Missouri. He received it from M. Theard, of New Orleans, who asserts that it was imported from France by his father, and planted on the banks of Pontchartrain, near New Orleans, where for thirty years it has yielded abundant and delicious fruit. Father Münch firmly believed it to be of S. European origin, and so does friend Munson to this day. Fr. Hecker was just as positive that it was nothing else than the Clavner-grape of his native country, Baden, Germany. Others hold that it is a true native American, belonging to the Southern division of the Æstivalis class, of which the Herbemont and Cunningham may serve as types, and of which they consider it a valuable variety, yielding a most delicious fruit, and making a very fine wine.

After many years' experience with this variety, we feel unable to form a decided opinion as to its proper classification.

Bunch medium size, shouldered, compact, very fine; *berry* small, round, black; flesh without pulp, juicy, sweet and vinous; quality best. Vine a good grower, moderately productive; canes very stout, of moderate length, short-jointed, having few large laterals, with heart-shaped (not lobed) foliage; requires winter protection. Ripens late. *Roots* wiry and very tough, with a hard liber; wood very hard, with a small pith and firm outer bark.

The *Louisiana* and *Rulander* (or rather what we *here* call Rulander) so closely resemble each other in general appearance, growth and foliage, that we are unable to distinguish them; they are undoubtedly closely related to each other. It is claimed that Louisiana makes the finest white wine, of Hock character, that we have.

ROBESON'S SEEDLING so closely resembles Louisiana as to consider it identical. CASPER, said to have been raised by Caspar Wild, of New Orleans, also resembles Louisiana, and if not identical, belongs certainly to the Rulander division of the Southern Æstivalis class or Bourquiniana (Munson).

Lulie. (*Labr.-Hybr.*) One of C. S. Copley's fine table grapes, raised at Stapleton, N. Y., from Telegraph crossed with pollen of Black Hamburg. The vine is hardy, healthy and productive, a strong grower, with healthy foliage, and has never shown either rot or mildew on the original vine. The bunch is large and showy; the berry large to very large, BLACK with a fine bloom; quality first-rate; no fox or impure taste; no pulp, rather meaty, not vinous, but of mild aromatic flavor; ripens early; valuable for table and market. Exhibited at the Columbian Fair, Chicago. Mr. Copley was awarded medal and diploma for this and five other of his new grapes.

Luna. (*Labr.*) One of Marine's seedlings, page 151; probably lost by the decease of its originator. It was the largest hardy WHITE grape we had seen before the appearance of the Pocklington and Niagara.

Lutie. (*Labr.*) Originated at Nashville, Tenn., by L. C. Chisholm (about 1884). This is one of those varieties which are praised by some, condemned by others. Vine, admitted by all, a vigorous grower, hardy, healthy and prolific; it has proven so also on our grounds. It resembles *Dracut Amber* (q. v. page 117) in many respects, and those who like that old variety and found it profitable will make no mistake in planting the *Lutie*. Its *bunch* is very compact; *berries* large, PALE RED at first, DARK RED when fully ripe, very sweet, very pulpy and foxy; skin tough, of fine appearance and ripens early, with the Delaware; hence it sells well as an early red market grape; but tastes greatly differ as to its quality. Our late M. P. Wilder, to whom specimens were sent from Nashville when first introduced, said that they were so offensive to him that he had to send them out of the house. Mr. Van Lindley, of N. C., finds it very fine in flavor. "Many good judges at our (North Carolina) State Fair pronounced it equal to any grape on exhibition. It is one of the most valuable Southern grapes." Pres't Berckmans, of Georgia, on the other hand, considers its only merits, that it is a vigorous grower, comparatively free from mildew and quite prolific. While Van Deman, of Washington, D. C., considers it the worst flavored and smelling grape he ever tasted. Again, Chas. Parry, of New Jersey, who is also recognized good authority, finds it not more foxy or offensive than Dracut Amber. Tastes differ; but never to such extent. We find that this discrepancy grew out of certain peculiar characteristics of this grape: Taken fresh from the vine, it is equal, if not preferable, to any grape of Labrusca character, but several

days after gathered, or when over-ripe, it gets quite foxy and drops badly from the bunch. Hence it is *not* desirable as a grape for market; but planted in our garden, for family use, to be consumed as it ripens, it is of REAL MERIT, and spreads a fine perfume. Here we may quote a true remark of Dr. L. C. Chisholm, the originator of the *Lutie* (who is quite innocent of the extravagant and ridiculous over-praise of this variety when first introduced in 1885). He says: "By merit we do not mean what many frequently call so: A few sample bunches of large size, fine color and other attractive features, yet destitute of the most important merits which a grape ought to possess, such as vigor in growth, resistance to disease, a good cropper one year with another, fruit of good quality, ripening up well together."

Lydia. (*Labr.*) Originated by Carpenter, of Kelley's Island, Lake Erie; supposed to be an Isabella seedling. *Bunch* short, compact; *berries* large, oval, light GREEN, with salmon tint where exposed to the sun; skin thick; pulp tender, sweet, of fine flavor, slightly vinous. In habit of growth the vine is not unlike the Isabella, but is much less productive. Ripens a few days later than the Delaware.

Lyman. (*Rip.*) Origin unknown. A Northern variety, said to have been brought from Quebec upwards of fifty years ago; hardy and productive. *Bunch* small, rather compact; *berry* round, medium, or below; BLACK, covered with a thick bloom; similar in flavor to Clinton, and ripens about the same time.

Sherman and *McNeil* are varieties grown from the above, but hardly to be distinguished from it.—*Downing.*

Lyon. (*Labr.* ×) A cross of Concord upon Delaware, originated by C. P. Chidester, of Olivet, Mich. The vine is vigorous and hardy; bunch and berry resemble Concord; the color being that of Delaware, PALE RED; the quality is good; the fruit ripens with Delaware. It was first exhibited in 1886 at the Michigan State Fair and there, thought very valuable, was named Lyon in honor of the President of the Michigan State Horticultural Society. But it proved sadly unproductive and is now abandoned.

Lyon. (*Rip.-Hybr.*) Another grape, finer and more promising, produced by T. V. Munson, of Texas, has now been honored with the name of *Lyon;* but it can scarcely be successful as far north as the home of the illustrious pomologist of that name, while it is much admired in the South.

Mabel. (*Æst.-Hybr.*) Originated by the late A. J. Caywood, of Marlborough, N. Y., from the seed of his Walter grape. Vine not a vigorous grower and moderately productive only; cluster medium, compact; berry below medium, BLACK with blue bloom; skin thin, tough; pulp almost melting, juicy; ripens a little before Concord. Not recommended except as an amateur grape in favorable localities.

Mabel. (*Æst.*) Another grape named "Mabel," raised near Freeport, Ills., resembling Delaware in color and general appearance, but with somewhat larger clusters and berries, with thick, heavy foliage, supposed to resist mildew, was considered as promising to be a valuable acquisition in 1879 has scarcely been heard from since, and is now forgotten.

Madeline. (*Labr.*) A chance seedling, grown by G. Henderson, Eddyville, N. Y.—Not known, except to *Mitzky*, "Our native grape"—said to be a WHITE grape with pleasant flavor, that ripens early.

Magnate. (*Labr.-Hybr.*) Originated from Concord, either by the late John Burr or by Dr. Stayman. The original vine was grafted many years ago and cannot be found. The variety is growing on the grounds of either and doing well; the vine is vigorous, hardy, healthy and very prolific; free from mildew and not as prone to rot; bunch medium to large, shouldered and compact; berry about large, WHITE, a little pulpy, but tender, sprightly sweet with some of the native aroma; quality very good, as good if not better than Concord and ripens about with it; will hang on the vines long after ripe.

Magnificent. (?) Originated by A. F. Rice of Griswoldville, Georgia; reported in 1891 to the Am. Pomological Society, by H. E. Van Deman, Washington, D. C.; among the novelties, at the same time with the "*Superb*" q. v. He says, from examining the specimen, that it seems of such worth that we ought to give it a trial. The color is dark RED, with purplish bloom; of the highest quality. We have not heard of it since.

Maguire is like Hartford, but more foxy.—*Strong.*

Mammoth Catawba. See Catawba Seedlings.

Mammoth Sage. (*Labr.*) Onondaga Co., N. Y., mother of Rogers' Hybrids.

Manhattan. (*Labr.*) Originated near New York. A poor bearer. *Bunches* small; *berries* medium, round, GREENISH-WHITE with a bloom; flesh sweet, rather pulpy.—*Downing.*

Mansfield. (*Labr.* ×) Raised in 1869 by C. G. Pringle, of Vermont, a well-known and successful hybridizer, from seed of Concord fertilized by pollen of the Iona; said to combine the more valuable characters of both these popular sorts. *Vine* a rampant grower, with broad and thick leaves, densely woolly beneath; *bunch* large, often shouldered, sufficiently compact; *berry* of PURPLISH-BLACK color under a slight bloom; large, somewhat oval; flesh tender, with but little pulp of a remarkably rich flavor. Season earlier than Concord. It was predicted that this will prove a valuable acquisition to the northern parts of our country as a very early variety. Has not been tried there, that we know of.

Marguerite. (*Labr.*) Raised by Theophile Huber, Illinois City, Ill. Vine a moderately strong grower; bunch very compact and shouldered, berries somewhat smaller than Concord, of light AMBER color; pulp tender, very sweet with a delicate Catawba flavor, but a slight bitterness of the skin when chewed.

Marguerite. (*Linc.-Æst.*) See Munson's Hybrids, page 159.

Marie Louise. (*Labr.*) Raised by Theophile Huber, Illinois City, Ill. Vine strong, very hardy and productive. Bunch large, shouldered, compact; berries about equal in size to Concord; a WHITE grape with small seed separating readily from the tender core, sweet and juicy; skin thin but tough. H. E. Van Deman disseminated some for testing, considering them worthy.

Marine's Seedlings. These grapes are crosses between purely native varieties claimed to be produced by a new and very simple process; diluting the pollen of the male flower with rain water and then applying it to the pistils of the variety which he selects as the female parent. Among the seedlings thus raised there are some which are quite peculiar and very interesting; some are of the *Æstivalis* family, but with berries of quite a large size: 1. *Nerluton*—fine large bunch; berries above medium, BLACK; leaf very large and leathery, strong. 2. *Greencastle*—same as the former, berries even larger. 3. *Luna*—WHITE, in appearance almost like Martha, but the gain in size seems to be coupled with a loss in quality, compared to our delicious, juicy, small Æstivalis grapes. A larger number of his seedlings are of the Labrusca type, and among these his "*U. B.*," BLACK; *Mianna* and *King William*, WHITE, seemed to us worthy of trial.

In fall of 1874, a year or two before his death, Marine wrote: "Now that I have reached my three score years and ten, I am admonished to yield the further prosecution of this branch of progress to others, more skilled, and to those coming after our time, believing, as I do, that much greater results are looked for in the future." His seedlings were not disseminated.

THE MARTHA GRAPE.

Marion. (*Rip.* ×) A variety brought to us from Pennsylvania by that indefatigable horticulturist, Sam'l Miller, who got it from Dr. C. W. Grant. It probably came from "Longworth's famous school of vines"; valuable for a dark red wine. *Bunch* medium, compact; *berry* medium, but considerably larger than Clinton, round, BLACK, juicy, sweet when fully ripe; ripens *late*, long after coloring, but hangs firmly to the bunch. Blooms early, with Clinton, which variety it resembles, yet, in our opinion, far surpasses.

Vine a very vigorous grower, but a shy bearer in our Vineyard; and somewhat liable to mildew; rambling but not so straggling as the Clinton. Wood firm with a medium pith. Foliage large, strong and abundant; when young, of a peculiar golden hue, and the branches of a beautiful red color. *Roots* wiry and firm, with a smooth, hard liber. (See N. B. WHITE'S Hybrids.)

Our recommendation of this variety for the French wine-grower had been long overlooked. The Vigne Américaine of March, 1883, contains the following: "With regard to intense coloring, without any foxy taste, nothing equals the wine made of the Marion grape; one-twentieth part is sufficient to give to water even a superior wine color; the somewhat violet shade is easily transformed into a lively red by adding some acid wine or a very small quantity of tartaric acid. This grape is a *loyal Fuchsin*." One vine-grower of Bordeaux reported that he is about to plant 500 Marion vines.

Marsala. (*Labr.* ?) A dark RED grape introduced by Dr. J. Stayman. Bunch and berry large, as large as "Goethe," of very handsome appearance but not very good quality, being rather foxy and pulpy; making however a good white wine, not to be compared nor confounded with the celebrated wine of same name, grown in Sicily, Europe, and resembling sherry wine, which is exported annually from the famous seaport "Marsala" to England and the West Indies. It seems objectionable to give to an American variety the name of a well-known foreign kind; it may create confusion, but cannot benefit either.

No experienced viticulturist would attempt to plant the old Italian grape here; while this native American "Marsala" may be well worth our attention, as the vine is very healthy, vigorous and productive, and specially liked for jelly and canning in Kansas. S. M. Tracy of Columbia, Mo., reported it in 1885 to have been grown there eight years, and less inclined to rot than any other grape we have. "This is one, among the very few, that does not rot."—*Sam. Miller.*

Martha. (*Labr.*) A white seedling of the Concord, raised by our friend Samuel Miller, of Bluffton, Mo. formerly of Lebanon, Pa., *was one of the most popular among the* WHITE *varieties. Bunch* medium, smaller than the Concord, moderately compact, shouldered; *berry* medium, round, GREENISH-WHITE —when fully ripe pale yellow covered with white bloom; skin thin; flesh tender, and of a remarkable sweetness unmixed with acidity and without vinous flavor; somewhat pulpy, often containing but a single seed. Odor decidedly foxy, but this character is much more apparent in the fruit than in its wine.

The vine is very healthy and hardy, resembling the Concord, but not as vigorous a grower, and the leaf is of a somewhat lighter green, the fruit less liable to rot than the Concord. *Roots* of average texture and liber. Canes generally more upright than Concord, with fewer laterals, but not so much inclined to ramble. Wood firm, with a medium pith. Very productive, and the berries hang well to the bunch. Ripens earlier than the Concord and will therefore suit even northern localities. It is grown largely for market, though not very good in quality, and far surpassed in appearance by some new varieties. Must 85° to 90°, about 10° higher than Concord. The wine is of a light straw color, of delicate flavor.

The French commission at the Exposition of Amer. wines at Montpellier, 1874, pronounced the *Martha* as "approaching the wines of Piquepoul, produced in the Hérault."

(See also "*Lady.*")

Mary. (*Labr.-Hybr.*) Introduced by Hasselkus, of Griffin, Ga., in 1889, and afterwards considerably planted in the vicinity of that locality. It bears unmistakably Rogers' ear marks, says the eminent horticulturist of the State Experiment Station of Georgia, *Hugh N. Starnes*, who does not think it identical with the Lindley, as some claim and which it certainly resembles; it has the long-jointed canes, but is more vigorous, the berries are larger and rounder; bunches shorter, more compact—less straggling—than Lindley; having fewer reflexed stamens. The color of the berries seems of a brighter RED and the flavor more sprightly, with less tanic acid than Lindley. These may be simply individual peculiarities, adds Mr. Starnes, and *Lindley* and *Mary* may be the same after all. He will further test and examine.

In the meritorious and interesting reports from the Central Experiment Farms of the Dominion, Ottawa, Canada, by the very able horticulturist, Mr. John Craig, a RED grape MARY is attributed to JACOB ROMMEL, of Missouri, who never produced a grape of that name. To make sure of this we wrote to old friend Rommel, who replied (July, 1894): "I know of no grape originated by me named Mary; * * You have always been favored with all of my seedling grapes for trial, in preference to all others, and I have of late years not raised any." Mr. Craig will please have this corrected; from his description we suppose it to be the LINDLEY or the same as the MARY introduced by Hasselkus, of Georgia.

Mary. (?.) Raised by Chas. Carpenter, Kelly Island. Vine hardy, strong grower. Fruit ripens too late for the north. *Bunch* medium, moderately compact; *berries* medium, round, greenish-white with a bloom. Flesh tender, slight pulp, juicy, sweet, brisk flavor.—*Downing.*

Another *Mary*, an early grape, is described by *Fuller.*

Mary Ann. (*Labr.*) Raised by J. B. Garber, Columbia, Pa. *Bunch* medium, moderately compact, shouldered; *berry* medium, oval, BLACK, pulpy foxy, resembling the Isabella. Very early, ripening a day or two before the Hartford, and therefore formerly esteemed as an early market grape, though of an inferior quality. Now superseded.

Mary's Favorite. (*Æst.-Hybr.*) A seedling of Delaware, crossed with a Rogers' Hybr.; raised by J. F. Coffin, Westland, Ind., vine vigorous and productive; *bunch* small to medium, shouldered; *berry* medium, BLACK with blue bloom; pulp not melting but juicy, sweet and vinous, skin thin, seeds few, a pretty little grape; season early. *S. A. Beach, N. Y., Experiment Station.*

Mary Mark. (*Æst.* ×) A seedling of the Delaware and much like it, raised by Dr. Stayman, of Leavenworth, Kansas; vine a weak grower, but hardy, healthy and productive; free from rot and so far also from mildew. *Bunch* medium, compact; berry medium, RED, tender, rich sprightly vinous, sweet, of fine quality.

Mason. (*Labr.*) Syn., MASON SEEDLING. A white grape raised by B. Mason, of Mascoutah, Ills., from Concord seed. *Bunch* medium to large; *berry* nearly as large as Concord, round, greenish-white, becoming yellowish when fully ripe, with a fine white bloom; skin thin; flesh melting, with little pulp; sweet with just sufficient acid to give it a sprightly, vinous, refreshing taste; almost free from foxiness. In quality this is one of the best of the White Concord seedlings. *Vine* a moderately vigorous grower, perfectly hardy, with heavy and healthy foliage; not subject to mildew. While not free from rot, this variety has suffered less from this disease than Concord itself, proving more healthy and of better quality than MARTHA. The Mason grape ripens a few days before Concord; it hangs a long time and keeps remarkably well on the vine. The foliage of the Mason resembles that of its parent, but is of a lighter green and has a more whitish down on the under side of the mature leaves. We confidently recommend this grape in localities where the Concord succeeds.

Massasoit. (*Labr.-Hybr.*) Rogers' No. 3. A fine early grape for table and market.

Vine a strong grower, and hardy; one of the earliest and best of Rogers' red hybrids, but subject to rot and mildew; and unfruitful if planted out of the reach of pollen from other varieties that blossom at the same time. We copy the following description by the late M. P. Wilder, the noble and celebrated veteran of American pomology:

Bunch rather short, medium size, shouldered; *berry* medium to large, color brownish-RED. Flesh tender and sweet, with a little of the native flavor when fully ripe. Season very early, same as the Hartford. Sufficiently vigorous and productive. A desirable garden variety, and in favorable localities (free from rot) it is a profitable grape.

Matchless. (*Labr.* ×) Originated by the late John Burr, of Leavenworth, Kans., (about 1887), from mixed seed; *Vine* vigorous, hardy and productive; free from rot and mildew on the original vine and location where tested. Bunch very large, compact, handsome; berry very large, BLACK; skin thin but tough; pulp rather tender, juicy, sprightly, rich, vinous sweet, quality very good; ripe early, soon after "Jewel," before Concord; and will hang long after ripe on its vines. This is a very attractive market grape of the Labrusca type without foxiness.

Mathilde. (*Æst.* ×) A seedling of Delaware. Raised by the late G. A. Esenberger, Bloomington, Ills. Specially recommended by the originator as a wine-grape. *Vine* vigorous and productive; *bunch* large, very compact, so much so that the fruit sometimes cracks; berry small to full medium, the small ones being often seedless, nearly round, handsome, dark RED with lilac bloom; pulp very juicy, almost melting, vinous, not sweet, but of good quality.

Maxatawney. (*Labr.*) A chance seedling, originated in Montgomery Co., Pa., in 1844. First brought into notice in 1858. *Bunch* medium, long, occasionally compact, not usually shouldered; *berry* above medium, oblong, pale yellow with slight amber tint on the sunny side. Flesh tender, not pulpy, sweet and delicious, with fine aroma, few seeds; quality best both for table and wine. Ripens rather late for northern localities; but where it fully ripens, as here in Missouri, it was considered one of the finest of our native white grapes. *Roots* slender, soft in texture and liber. Canes light and of moderate length, with average number of laterals. Wood soft with a large pith. Vine healthy and hardy, needs no protection in winter, but not a strong grower, nor very productive, and in bad seasons inclined to mildew and rot; foliage large, deeply lobed.

We recommend it only for garden culture, in good rich ground.

MAXATAWNEY (*half diameter*).

Mead's Seedling. (*Labr.*) See Catawba Seedl., p. 100.

Medora. (*Æst.-Hybr.*) A seedling of the *Lenoir* probably crossed with the *Croton*, as the clusters from which the seed was taken came from a Lenoir vine interlaced with the branches of a Croton vine in Onderdonk's experimental vineyard. Dr. Thomas R. Cocke, an old esteemed amateur horticulturist and friend of Onderdonk, living about twenty miles below Victoria, Tex., towards the Gulf, carefully planted that seed, and selected this one as the most promising of those seedlings. The *foliage* is like the Lenoir, except that its young terminals show little of the pink tinge which is characteristic in the Lenoir; the *berries* are white, medium, round, translucent enough to see the seed, and of a delicious flavor; the *bunches* are medium to large, about the same as the Warren; the vine not a very vigorous grower and inclined to over-production.

Onderdonk thought this will prove the happiest acquisition to the grapes of the Gulf States since the Herbemont and Lenoir; he is now propagating it, and suggested the name MEDORA, being that of a daughter of Dr. Cocke.

Mendota. (*Labr.* ×) Originated (1883?) by the late John Burr, of Leavenworth, Kan., from mixed seed; vine very vigorous, hardy and productive, seems to be exempt from rot and mildew. *Bunch* medium, compact, handsome, *berry* medium, BLACK, tender, sprightly sweet, quality good; ripe very early, about with Jewel; this grape is not as good in quality as *Jewel*, but is a much stronger grower and more productive.

Merceron. (*Labr.*) See Catawba Seedling, p. 100.

Merrimack. (*Labr.-Hybr.*) Rogers' No. 19. Mammoth Sage crossed with Bl. Hamburg. Regarded by some as the finest black grape in the collection of Rogers' hybrids.

It is one of the most reliable varieties in all seasons. Vine very vigorous; usually healthy and exempt from mildew and rot; but not fully self-fertile; *bunch* usually smaller than his other *black* sorts; *berry* large, sweet, tolerably rich. Season early; (about the 20th September, in Massachusetts).

We prefer his No. 4, the "Wilder", which is like it in quality, with by far larger and heavier bunches, and more profitable.

Metis. (*Hybr.-Labr.* × *Vin.*) Produced by C. Engle, of Paw Paw, Mich., from seed of Rogers' Salem, of which *all* his varieties originated, and they are all very vigorous, hardy and productive, and as far as tested, deserves to be disseminated. Bunch short, compact, shouldered; berry Catawba colored, large, meaty and of very good quality; ripens a little before Concord, about with Worden.

Metternich. (*Rip.* ×) A seedling of Poughkeepsie crossed with Clinton. Produced by A. J. Caywood, Marlborough, N. Y. Color BLACK. S. A. Beach, Hort. of the N. Y. Experiment Station, describes it: Bunch small to medium, compact; berry medium, light RED (!?) translucent; skin thin, tender; pulp tender, sweet, sprightly and pure flavored; an early grape that thus far (1888-1893) has proved moderately productive.

Michigan. (*Labr.-Hybr.*) Originated by C. Engle, of Paw Paw, Michigan, from seed of Roger's Salem. Vine vigorous grower, hardy and productive; bunch medium to large, compact, sometimes shouldered; berry above medium, WHITE, fretted with russety streaks; quality very good for table, ripens with Concord.

Miles. (*Labr.*) Origin West-Goshen township, Chester County, Pa. Vine a moderate grower, hardy and productive; *bunch* small, rather compact; *berry* small, round, BLACK. Flesh tender, slight pulp at center; brisk vinous, pleasant. Ripens among the *earliest*, but does not hang long. We cannot recommend it for vineyard culture as a market grape, but rather for family use as a *good early* table grape, especially for the North.

Mills. (*Labr.-Hybr.?*) Raised by William H. Mills, of Hamilton, Ont., by crossing Muscat-Hamburg with Creveling. Vine vigorous and productive, with large and healthy foliage, but prone to mildew. When attacked by this fungus-disease, however, it proves a signal failure. "A beautiful grape of fine quality, keeping until March," said a noted Michigan grape grower; "but first you must have it," interposed a Missourian. *Bunch* very large, compact, shouldered; *Berry* large, round, JET BLACK, covered with a thick bloom; flesh meaty, juicy, with a sprightly Muscat flavor. Skin thick, seeds large and long, similar to those of Agawam; berries adhere firmly to the peduncle; ripens about with the Concord, or a little later, provided it is kept free from mildew.

P. J. Berckmans, of Augusta, Ga., says: Mills seems to be a pure Vinifera; two years fruiting impresses me favorably with this variety. Thus the best judges differ, because the grape differs in different *localities;* it is very successful and suited to one and worthless in some other.

Mineola. (*Labr.-Hybr.*) Raised by Chas. S. Copley, of Staten Island, N. Y., from a seedling of Telegraph fertilized by Chass. Musquè. The vine is medium strong only in its growth, yet healthy, hardy and productive, with light brown short jointed wood; the leaves dark green on the upper, lighter on the under side; three and five lobed coarsely toothed on edge; in bad seasons only has it shown any mildew or rot. *Bunches* full medium, cylindrical, seldom shouldered, sets well, rather close, and will hang until frost; berries about the size of Concord, slightly oval, WHITE or pale yellow, transparent, no pulp, of a rich muscat flavor, (not a trace of so called Fox); skin medium, does not crack; ripens very early, (Aug. 20 to Sept. 1, at Staten Island.)

Miner's Seedlings. (Not to be confounded with *Minor's* Seedling or *Venango.*) Produced by the late T. B. Miner, at Linden, Union Co., N. J. The following have been selected out of 1500 seedlings grown by him in central New York: *Adeline, Antoinette, Augusta, Belinda, Carlotta, Eugenia, Ida, King William, Lexington, Linden, Luna, Rockingham,* and *Victoria.* Most of them are WHITE grapes; nearly all are of the same strain; hardy; good size of bunch and berry, good quality, but all more or less foxy and not sufficiently meritorious to disseminate them.

Minnehaha. (*Hybr.*) Said to have been produced by the late Pres't MARSHALL P. WILDER, by crossing Muscat of Alexandria upon Rogers' Massassoit. It probably is not in existence today. Pres't Wilder was experimenting in the same line of further crossing hybrids, Rogers and others, a second time, upon foreign varities, he, however, as also Geo. W. Campbell, found that useful improvement did not lie in this direction; and that all crosses bearing three-fourth foreign and but one-fourth native blood were probably unsuited to our climate. A crossing of hybrids upon our best and hardiest natives, seems needful to produce really valuable results.

Minnesota Mammoth. Origin unknown; introduced in fall of 1879 by L. W. Stratton, Excelsior, Minn.; said to be a very prolific and hardy native grape, the berries of which are as large as pigeons' eggs, and to have a fine delicate flavor. We have been unable to obtain any definite information about it.

Minor's Seedling. (*Labr.*) (See Venango.)

Miriam. (*Labr.-Hybr.*) Raised by W. H. Lightfoot, of Springfield, Ills., from seed of Lady Washington. *Vine* very vigorous, hardy and healthy, long-jointed, with fine healthy, large leaves. Bunch large, compact, shouldered; berries large, BLACK, juicy and sweet; ripens two weeks later than Concord; of superior quality. A fine amateur grape for Central Illinois.

Mish. (*Rotund.*) See Scuppernong.

Missouri. Syn., MISSOURI SEEDLING. Mentioned by *Buchanan* and *Downing,* but now unknown even in Missouri. According to Downing: Probably a seedling from one of the Pineau or Burgundy grapes.

Bunches loose and of moderate size; *berries* small, round; skin thin, almost black, with little bloom; flesh tender with little pulp, sweet and pleasant; not very productive nor of vigorous growth.

It probably never came from Missouri.

Missouri Riesling.* (*Rip.* ×) Syn., GREIN'S No. 1. Raised by the late Nicholas Grein, Hermann, Mo., from *Taylor* seed.

Vine hardy and very healthy; a moderate grower, comparatively short-jointed; with healthy thick leaves; very productive. *Bunch* medium, moderately compact, slightly shouldered; *berry* medium, round, GREENISH-WHITE, but light red when fully ripe; very tender pulp, juicy, sweet, of fine quality, making an exquisite white wine; and on this account it is now largely planted by wine-growers of Missouri, Illinois and Ohio, but too late for locations further north. Ripens ten days after the Concord. Friend Rommel justly calls it "a Sister of Elvira."

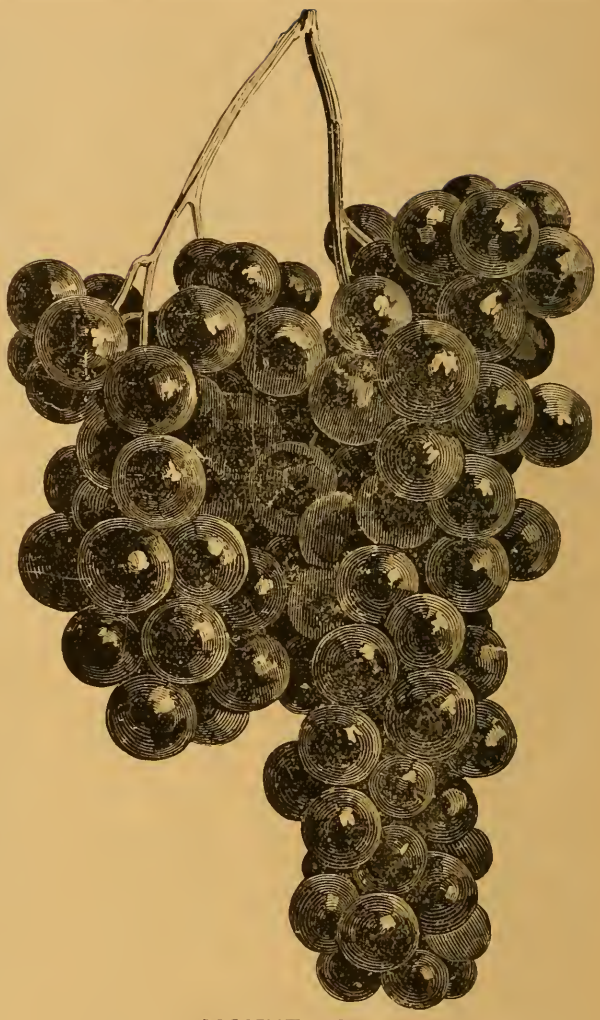
Modena. (?) Originated by the late A. J. Caywood, of Poughkeepsie, N. Y. *Bunch* and *berry* small. BLACK, vine strong and hardy. We could not get any reliable information, nor the vine for trial. It is perhaps the same as MINGO? of which friend *Sam. Miller* told us: "This makes the darkest and one of the best wines I have ever tasted."

Moltke. (*Labr.-Hybr.*) Seedling of Salem, raised by Rautenberg, of Lincoln, Ill. Has character and color like Agawam, but of a somewhat darker hue when fully ripe. *Bunch* medium, sometimes shouldered, *berries* very large, oblong; *skin* thick, pulp soft, sugary and aromatic; vine very productive and vigorous, *wood* medium short-jointed; buds prominent; the whole appearance of the vine resembles Agawam; but it ripens ten days earlier and is sweeter, may mildew, like all the Rogers in some localities;—a long keeper.

Monroe. A cross between the *Delaware* and the *Concord;* raised by Elwanger and Barry and described as follows:

Bunch medium to large, shouldered,—something like Concord; *berries* large, round; skin rather thick; BLACK covered with a white bloom; very handsome. Flesh juicy, sweet, (sub-acid), vinous, sprightly; a pleasant, refreshing table grape. The vine is vigorous, with firm, short-jointed, hardy wood and fine healthy foliage; it is grown successfully in some localities. Ripens with Hartford. The MONROE is, however, dropped from Elwanger and Barry's select list of grapes in their own catalogue.

Montefiore. (*Rip.* ×) Rommel's Taylor-Seedling No. 14. *Vine* moderately vigorous in growth, but very healthy and hardy; sufficiently productive. Both wood and foliage show considerable admixture of Labrusca with Riparia. *Bunch* small to medium, compact, sometimes shouldered as in annexed engraving; *berries* of small medium size, round; skin thin but firm, BLACK with a delicate blue bloom, and rich in coloring matter; flesh melting, vinous, sweet, with a delicate aroma and a delicious flavor, uniting fine quality with productiveness; ripening (a few days) after Concord, and before Norton's Va. Seedling.



MONTEFIORE.

This unostentatious grape attracted the attention of our senior when Rommel first exhibited it at Rochester, N. Y., where the Am. Pomol. Society met, August, 1879. With consent of the originator, we have given it the name of the great Jewish philanthropist MONTEFIORE, which name denotes at the same time a "*Mountain-flower.*" It has fruited for years, in various localities, with quite satisfactory results, even in seasons when the Concord rotted badly.

At the Hermann Fair, 1882, this grape was awarded an extra premium as *the best new Seedling for Red Wine*, and none equal to it for that purpose has been produced since. This fall, 1894, our vines of the *Montefiore* were well loaded with perfect bunches and the must weight was 90°. Equally favorable re-

* Pronounce: *Reesling.*

MOORE'S DIAMOND.

ports came from Euclid, O., and other places. Northern wine-growers have not given to this variety the attention it deserves, or else it would be planted more extensively, being superior to most other Red wine grapes that ripen so far north. The *Montefiore* is quite acceptable also for a table grape notwithstanding its small size.

Moore's Diamond. (*Labr.* ×) Syn., Diamond. Originated by Jacob Moore, of Attica, N. Y., from seed of the Concord fertilized by Iona, in the year 1873 while a resident of Brighton, N. Y., where it has been grown and fruited ever since and endured the winters uninjured without protection. The vine is a vigorous grower and productive, perfectly

maturing its wood and retaining its foliage, which is large, of a dark glossy green, resembling its parent Concord. The bunches are large, handsome, compact, often double-shouldered; berries of full medium size, adhering firmly to the stem. Color a delicate GREENISH-WHITE, with yellow or amber tinge when fully ripened; flesh tender with few seeds, juicy, sprightly, sweet, *refreshing;* skin thin, nearly transparent, yet sufficiently tough to bear packing and handling well; probably too tender for distant shipment. Quality very good, superior to other hardy white grapes, and the fruit ripens at least a week before the Concord. Judge Miller considers it the best white out-door grape we have, in which opinion some of the best judges agree. President P. J. Berckmans, of Augusta, Ga., recognized as best authority, especially for the South, says: "Moore's Diamond is unquestionably the most attractive and earliest white grape cultivated South." Geo. W. Campbell, however, found it unproductive on his place for some years, while reports from other localities, he is glad to say, indicate that this is not always its character. Ellwanger and Barry place it at the head of their latest select list of grapes, directing special attention to its superior merit. Its good quality and showy appearance render it a special favorite with the birds—the BEST judges.

Our illustration is after the Photograph of an average bunch, true to nature.

MOORE'S EARLY.

Moore's Early. (*Labr.*) Originated by John B. Moore, at Concord, Mass., from Concord seed in 1872 and introduced in 1877. The illustration is an exact copy from a photograph of the bunch, and it could not be better described than by calling it an *Early Concord.* (See "Concord," page 106.)

Bunch smaller and rarely shouldered, but *berries* somewhat larger. It is, in similar soils and localities, as healthy and hardy as its parent; though not as productive or vigorous, it is almost equal to the Concord in quality, but ripens ten days to about two weeks earlier. Its large size and earliness render it desirable and made it a popular market grape which has been largely planted. It needs careful cultivation and liberal manuring. Being better than "Hartford," "Champion," or

"Talman," and quite as early, it is recommended to supersede these undesirable varities. It has been awarded first premiums at many horticultural exhibitions.

Mottled. (*Labr.*) Originated with Chas. Carpenter, Kelly's Island. A seedling of Catawba. Earlier in ripening and less disposed to mildew and rot than its parent. Charles Downing says: "A profuse bearer, ripening with Delaware. It will hang a long time after ripe, and keeps unusually well."

Bunch medium size, very compact, slightly shouldered; *berries* medium to large, round, distinctly mottled when held to the light, with different shades of red or maroon while ripening, but nearly a uniform dark Catawba color when fully ripe. Flesh sweet, juicy, vinous; of brisk, sprightly flavor, always rather pulpy and acid at the centre. Skin thick. Season late, ripening with Norton's Virginia. Hangs well to the bunch, and improves by being left long on the vine; more desirable as a wine than as a table grape. Vines healthy, hardy, moderately vigorous, and productive; foliage abundant; wood short-jointed.

We found it a poor grower and bearer.

Mount Lebanon. (*Labr.*) Originated by George Curtis, of the United Society of Mount Lebanon, Columbia county, N. Y.; supposed to be a cross of Spanish Amber and Isabella. *Bunch* larger than Northern Muscadine; *berry* round, REDDISH. Flesh pulpy, tough, though sweet, *perhaps* a little better than Northern Muscadine.

Moyer. (*Æst.-Hybr.*) Syn., JORDAN grape. Cross between Delaware and some purely native variety raised by Allen Moyer, of Ontario, Canada. A small and very early RED grape, resembling Delaware. *Vine* a vigorous, though slender, rather short-jointed grower; very hardy with good foliage; neither leaf nor fruit seem subject to mildew, even in seasons where other vines around it are affected by this disease. *Bunches* small shouldered, but often loose, by reason of imperfect blossoms. *Berries* of about same size as Delaware and adhere tenaciously to the stem. Pulp very juicy, sweet and tender to the center: but inferior in quality to Delaware. Ripens very early; fully two weeks before Concord. Yet an amateur grape only worthy of trial in the North.

Geo. W. Campbell, when asked for his opinion of this grape, said: "I can see very little to recommend it beyond healthy foliage and early ripening." With us it proved a slow and weak grower, unproductive.

Mrs. McLure. (*Rip.-Hybr.*) One of Dr. Wylie's hybrids; a cross between Clinton and Peter Wylie. *Bunch* medium, not very compact, shouldered; *berries* medium, WHITE, very vigorous, quality good as a table variety, and probably valuable also as a white-wine grape. Foliage resembling Clinton, growth very rampant.—*Berckmans.*

Mrs. Stayman. (*Æst.* × ?) Originated by Dr. J. Stayman, of Leavenworth, Kan., produced from Delaware. (?) *Vine* very vigorous, hardy, healthy and productive; foliage strongly Labrusca; *bunch* large, compact; *berry* above medium, RED, tender, juicy, sprightly sweet, with some of the native aroma; quality very good; ripens about same time as Concord and does not rot nor mildew on the originator's grounds; it would probably succeed well where Concord does—a wide enough range.

Munson's Hybrids and Seedlings. Mr. T. V. Munson, of Denison, Texas, has produced many thousand of Hybrid and Seedling grapes; and after having carefully tested them for years, in fruiting, he has determined to introduce now (1894) thirty-six of these varieties which he considers his best. We give here the names only (in alphabetical order), and refer those who desire further information to Munson (or to us) who will, on application, furnish his general catalogue:

ADMIRABLE.....(*V. Linc.* × *V. Æst.*)
AMERICA, p. 86.....(*Post-Oak* × *Rupestris*)
BAILEY.....(*Post-Oak* × *Triumph*)
BEACON, p. 89.....(*Post-Oak* × *Concord*)
BELL, (see Green Mountain)..(*Elvira* × *Delaware*)
BIG EXTRA.....(*Post-Oak* × *Triumph*)
BIG HOPE.....(*Post-Oak* × *Triumph*)
BLACK HERBEMONT.....(*Herbemont Seedling*)
BRILLIANT, p. 96.....(*Lindley* × *Delaware*)
CARMAN, p. 99.....(*Post-Oak* × *Triumph*)
DR. COLLIER, p. 117.....(*Post-Oak* × *Concord*)
DELICIOUS.....(*Post-Oak* × *Herbem.*)
EARLY GOLDEN, page 119.....(*Triumph Seedling*)
EARLY WINE.....(*Post-Oak* × *Rupestris*)
ELVICAND, p. 123.....(*Elvira* × *Mustang*)
FERN MUNSON, p. 127.....(*Post-Oak* × *Triumph*)
GOLD COIN, p. 128.....(*Norton* × *Martha*)
GOVERNOR ROSS.....(*Triumph Seedling*)
HOPKINS.....(*Post-Oak* × *Cynth.*)
HERMANN JAEGER, p. 138....(*Post-Oak* × *Herbem.*)
LAUSSEL.....(*Post-Oak* × *Gold Coin*)
LINDHERBE.....(*Lindley* × *Herbem.*)
MARGUERITE.....(*Post-Oak* × *Herbem.*)
MUENCH.....(*Neosho* × *Herbem.*)
MRS. MUNSON.....(*Neosho* × *Herbem.*)
NEVA MUNSON.....(*Neosho* × *Herbem.*)
NEWMAN.....(*Post-Oak* × *Triumph*)
ONDERDONK.....(*Herbemont Seedling*)
OPAL.....(*Lindley Seedling*)
ORIOLE.....(*Post-Oak* × *Devereux*)
PERRY.....(*Post-Oak* × *Herbem.*)
RAGAN.....(*Post-Oak* × *Triumph*)
ROMMEL.....(*Elvira* × *Triumph*)
R. W. MUNSON.....(*Post-Oak* × *Triumph*)
W. B. MUNSON.....(*Post-Oak 3* × *Triumph*)
VINITA.....(*Post-Oak* × *Herbem.*)

This list of thirty-six varieties gives a succession in ripening beginning with Brilliant as early as Hartford, or just before Delaware, for three months, ending with Neva, Fern, Laussel, as late as Herbemont and Nortons.

Prof. Munson writes us: "These varieties which I have propagated and listed from among my seedlings and hybrids are the cream from about 40,000 grown. If as many as a dozen are permanently retained, I shall feel that my work has not been in vain." He does not want to burden the public, or our Catalogue, with the names, numbers or descriptions of his hundreds of varieties, the great majority of which he will throw away, as tests may determine, to find a nameless grave. Grape growers only who have seen his productions in their vigorous glory, surpassing the old standards, and doing this year after year, under ordinary vineyard culture, those only who have tasted them, as we have,

can appreciate Munson's work and his modesty.

"Among that splendid list of new grapes," says H. Jaeger, of Neosho, Mo., "eight of the most exquisite varieties are crosses of Herbemont on wild Post-Oak or summer grapes of Texas and Southwest Missouri. Mr. Munson with his characteristic conscientiousness recommends these for the South only. I am glad to be able to state that four of them, tried here, have stood 20° below zero. It seems safe, therefore, to conclude that with good spraying, these Southern grapes will prove hardy enough for the latitude of Central Missouri. Mr. Munson's other grand acquisitions will succeed far north of Missouri. * * * Munson's great work insures an immense improvement in the quality of our grapes, and spraying with copper solutions has made their yield so much more certain, that we can confidently look forward to a great revival of American viticulture."

Geo. W. Campbell says (1894) about the work of Prof. T. V. Munson: "It may be too early to say anything positive or definite as to its importance; I believe he is and has been for some years, doing more extensive work in striving to improve our native grapes than has ever been done or attempted by any other person. * * * Many specimens of his productions, as they are grown in Texas, are of very high character, remarkable not only for fine appearance but excellence in quality."

Munson. (*Linc.* × *Rup.*) Syn., JAEGER'S No. 70. It was produced by Hermann Jaeger, at Neosho, Mo., by fertilizing *Lincecumii* or *Post-Oak* (No. 43) with pollen of a male vine of the species *V. Rupestris;* combining the vigor, deeply penetrating roots, with resistance to rot, as also to the extremes of drouth, heat and cold; it stood without injury a blizzard, with a temperature of 27° below zero, that killed the eyes of Concord, Ives and Norton's Vines in its immediate vicinity. Prof. T. V. Munson wrote (February, 1894): "I think it quite proper and would feel honored in having your No. 70 bear my name." The wood, foliage and fruit of this variety with large clusters and berries of its parents, plainly show the blending of the two widely varying species, and anybody familiar with *Rupestris* and *Post-Oak* Vines will admit that it is impossible to combine greater resistance to extremes of both cold and hot weather, as also to drouth. The *Vine* is fertile to a fault; inheriting from its male parent the faculty of producing three bearing shoots from each bud, besides fertile shoots on old wood. Bunches and grapes are BLACK, about the color and size of Ives, or a little smaller and generally less compact; ripens about two weeks before Norton and hangs long to the vine. It yields a claret wine of good body and intense ruby color, having just enough of the peculiar flavor of the Lincecumii grape to be admired by some for its fruity taste. In France, Mr. Contuson, of Aubenas, has produced a hybrid from this, the Munson, and a French grape, which was awarded the first prize, the gold medal, in competition with the best French clarets.

Naomi. (*Rip.-Hybr.*) A hybrid of Clinton and one of the Muscats produced by J. H. Ricketts. Downing describes it as follows:

Vine very vigorous, very productive, long-jointed; leaves very large, deeply lobed, coarsely serrated; *bunch* large, shouldered; *berry* medium, roundish-oval, PALE GREEN, often with a tinge of RED in the sun, covered with a thin whitish bloom; flesh juicy, melting, rather crisp, sweet and sprightly, and with a trace of Muscat flavor; quality very good. Ripens with Concord.

Ricketts pronounces it one of the most magnificent grapes for the table that ever grew. (See remarks Sub. R. on Ricketts' Hybrids.) With us it does not succeed, suffering, as most hybrids do, from mildew (*Peronospora*); where this disease is unknown or properly treated, this grape may be most desirable.

The annexed illustration is reduced to two-thirds its natural size.

Nectar. (*Labr.-Hybr.*) A cross of Concord and Delaware, originated in 1883, by the late A. J. Caywood, of Poughkeepsie, N. Y. (First named *Black Delaware*, which name was changed by its originator.) Vine a fairly good grower, with medium short-jointed wood and dark green, deeply serrated foliage, not disposed to mildew; hardy, healthy and productive (but unproductive in some localities.) The clusters and berries are of medium size, somewhat larger than Delaware, well formed and handsome; color JET BLACK with fine bloom; quality very good and ripening with Delaware. The berries do not crack nor fall from the stem, they are vinous of pure rich flavor and keep well. So far as tested it has shown no tendency to rot; seems quite promising and worthy of trial,—with the probability that it will be found valuable for more general cultivation. The *Rural New Yorker* says: "Every year we value it more and more. In quality it is the best grape in *The Rural's* collection. The vine is hardy, free from mildew, as are the berries free from rot."

Neff. (*Labr.*) Syn., KEUKA. Originated on the farm of one Mr. Neff, near Keuka, on Crooked Lake, N. Y. *Bunch* medium; *berry* medium, dark COPPER RED. Flesh pulpy and somewhat foxy. Good native, early.

Neosho. (*Æst.*) Found growing wild on the farm of E. Schoenborn, near Neosho, Southwest Missouri. In 1868, Hermann Jaeger sent grafts of this (and other varieties of wild summer grapes) to that pioneer of Missouri vintners, Hon. Fred. Münch, who, finding it to be of superior quality, recommended it, and called it the "Neosho." It gained in Papa Münch's favor every year, and he loved its wine to the end of his life.

S. Miller wrote in 1873: "The fragrance of the Neosho grape is unsurpassed by any grape that ever tickled my olfactory nerves." So also thought our enthusiastic, now lamented friend, Münch; but in other localities it produced unsatisfactorily and the flavor or bouquet of its wine found no favor.

Bunch and *berries* are of the same size as Norton's—the bunches compact, shouldered, heart-shaped. The skin of the berries is thin, BLACK with blue bloom, very dark, yet contains but little coloring matter and less tannin; the pulp is meaty, sweet and spicy, with but little acidity. Seeds rather large. The wood of the Neosho is extremely hard and tough; it cannot be propagated from cuttings. The vine is a most vigorous grower when once established on its own roots, or successfully grafted; requires plenty of room, and prefers spur-pruning on old wood. It is so hardy that it may be said to resist all the extremes of our changeable climate in Missouri. The *roots* are strong and wiry. The foliage is coarse, but of beautiful color—dark and glossy green—and retains its freshness till frost sets in. The must, though fermented on the husk for two days, produces a wine of a beautiful greenish-yellow color, and has a peculiar aroma. It ripens with Norton's Virginia.

Neva Munson. (*Neosho* × *Herb.*) See Munson's best grapes, p. 159. This is ripening very late; hence adapted to the South only.

Newark. (*Rip.-Hybr.*) A hybrid of Clinton and Vinifera, raised in Newark, N. J. Vine of vigorous growth, hardy and very productive. *Bunches* long, loose, shouldered; *berries* medium, dark, almost BLACK, sweet, juicy and vinous, of pleasant taste; but, however, promising for a few years, it becomes soon diseased, its fruit subject to rot, and perishes, like its European parent. It can not be recommended.

Newburgh. (*Labr.-Hybr.*) One of Ricketts' Seedlings. Not known here.

New Haven. (*Labr.*) See Concord Seedl., p. 107.

Newman. (*Linc.-Hybr.*) See Munson's Seedlings, p. 159.

Newport. (*Æst.*) Said to be a seedling from and similiar to Herbemont.

THE NAOMI GRAPE. Reduced $\frac{1}{3}$.

Niagara. (*Labr.* ×) This grape "heralded like Niagara herself as one of the wonders of the world," with a growth of vine and foliage unsurpassed by any; originated in 1872 with Hoag & Clark, of Lockport, N. Y., who give the following description of it:

Vine a cross of Concord and Cassady, hardy, healthy, very vigorous and very productive; wood rather long-jointed; leaves large, thick, leathery, downy, lobed, sometimes double-lobed, much like Hartford. *Bunch* medium to large, from 8 to 14 ounces in weight, compact occasionally shouldered; *berry* large, roundish, slightly inclined to oval, quite uniform in size; skin thin but tough, PALE GREEN at first, but changing to PALE YELLOW when fully ripe, with a thin whitish bloom; flesh soft, tender, sweet, pleasant, and in quality about the same as Concord, ripening with it or soon after: it has quite a foxy odor when first gathered, but loses much of this when fully ripe, and has then a flavor and aroma much liked by those who have tasted this grape.

The proprietors of this grape jealously guarded for many years against its being propagated by others, expecting that the fine appearance of its fruit, at Exhibitions and on the markets of great cities, would enable them to introduce it on a large scale, at a high price. For this pupose, and to still further test this grape, the proprietors furnished vines for vineyard planting on *special terms*,—and succeeded.

For localities suited to the "*Niagara*," it has apparently acquired an assured position as the leading white market grape and is now *extensively* planted, proving to be a profitable market grape. Its description, as quoted above, is correct. It is a very strong grower and abundant bearer; to the sandy soil of our lake shore it is specially well adapted; and it is undoubtedly a fine looking grape when well grown; but is disposed to mildew and rot in unfavorable seasons, and will not endure severe winters without protection. In the Southern States, however, excellent results have been obtained; its quality seems to improve, as it is cultivated southward, and it ranks there amongst the most profitable early market grapes. We have also tasted a very fine white wine made from the Niagara grape by the "Gast Wine Co.," of Baden, near St. Louis, Mo.

Noah. (*Rip.* ×) Raised from TAYLOR seed by *Otto Wasserzieher*, Nauvoo, Ill., in 1869; then twice transplanted, sent to us for testing, and fruited first in 1873.

Bunch medium, shouldered, compact (yet not too closely compact, well-filled, but not over-crowded); *berry* medium to above medium in size, being but slightly smaller than Concord; of GREEN color, turning yellowish when fully ripe; skin thin but firm, transparent; not very juicy, pulp firm yet melting, and of excellent quality. Its *must*-weight is

10° above that of Concord grown and pressed in same locality; time of ripening about ten days after the Concord. *Foliage* large and firm, glossy, with a very slight down underneath and adhering well to the vine until frost.

From this description it will be seen that it resembles Elvira in some respects, which is quite natural, being of same parentage, but is *quite distinct* even in appearance, and there is no difficulty in distinguishing the two in foliage and fruit. It has also a firmer skin, which will *not crack* as that of the Elvira, but is more inclined to mildew than the latter. Both grapes are excellent for white-wine; for table use we have better varieties.

The Noah was first disseminated in 1876, and has now gained great popularity. At a test of the must, made by impartial experts, the Noah stood 100° on Oechsle's scale with 7.50 per mille acid, whilst at the same time the Elvira weighed 88° with 5 per mille acid.

Reports from most parts of this country, in regard to growth, health, &c., are very favorable; the fruit mildews however, in unfavorable seasons, but is less liable to rot than other varieties.

E. A. Riehl, of Alton, Ill., after a long tramp among the vineyards of Illinois and Missouri, wrote: "Of the NOAH, I predict that it will grow well, bear well, keep well on the vines, ship well, sell well, and make lots of money for its growers. In fact, it will be a white grape for the million."

J. Balsiger, of Highland, Ill., favored us with the following lines: "I am very thankful to you for having sent me this valuable variety. Too much cannot be said of its good qualities, according to my observations."

In France, also, the Noah has become a favorite, and is largely planted.

The accompanying illustration is copied from a photograph, and represents two bunches, *below* average size, of this valuable variety. The size is reduced; the single berry shows the full natural size.

Nonantum. (*Labr.*) See Isabella, page 141.

Norfolk. (*Labr.-Hybr.*) Originated by *N. B. White*, of Norwood, Mass. A vigorous grower, bearing fine fruit of a slight Muscat flavor. It so nearly resembles the *Catawba* that it would be taken for nothing else, if it did not ripen even *before the Concord*. At least, the originator showed to a committee of the Mass. Horticultural Society that the Norfolk was fully ripe on his place while his Catawbas had barely begun to color. The vine is said to be an abundant bearer of remarkably showy fruit, heavily covered with lilac bloom, and to have withstood a temperature of 18 degrees below zero without protection and without injury.

North America. (*Labr.*) *Bunch* medium, shouldered; *berry* round; BLACK, juicy but foxy. Ripens about with Hartford. Vine vigorous, unproductive.

North Carolina. (*Labr.*) This seedling originated with that veteran pomologist, J. B. Garber, of Columbia, Pa.; it belongs to the Isabella type, and is a showy market grape of poor quality; *Bunch* medium to large, occasionally shouldered, moderately compact; *berries* large, with a slight blue bloom; flesh pulpy but sweet; skin very thick; hangs well to the bunch, and will keep well and carry to market in good condition. Ripens early, coloring a few days before the Concord. Vine a rambling grower, hardy and very productive; requires long pruning and "plenty to do." *Roots* abundant, thick, firm, with a tolerably hard liber; is a good resistant to Phylloxera, but much subject to rot. Canes of medium thickness, long and rambling, with an average complement of laterals. Wood firm with a medium pith. The initiated can also make a good Muscatel wine of it. Must 84°.

Northern Muscadine. (*Labr.*) A seedling raised by the Shakers of New Lebanon, N. Y. A decidedly foxy grape, resembling in that respect Dracut Amber; of dull amber color. Opinions differ widely about its value. Papa Münch (as we called our venerable friend, the late Fred'k Münch), placed it as a table grape next to the Diana, and as a wine grape far above the Vanango. *Bunch* medium, compact, almost round; *berry* medium to large, DARK AMBER colored or BROWNISH-RED, flesh pulpy and foxy, sweet, skin thick. Berries round and showy, apt to drop from the bunch when ripe. Ripens about two weeks before Catawba. Vine of luxuriant growth, hardy and productive. Its must will probably be found valuable to mix, in small proportion, with some other variety, to which it would impart, we believe, a fine Muscat flavor.

Norton or **Norton's Virginia.** (*Æst.*) A native wild grape found on Cedar Island, James river, near Richmond, Va., discovered there in 1835 by Dr. F. A. Lemosq and recommended as a wine grape by Dr. D. N. Norton, an amateur horticulturist, and one of the pioneers in horticulture near Richmond, Va., who introduced it to public notice. A. J. Downing described it in his "Fruits and Fruit Trees of America" as a cross between the Bland and Miller's Burgundy. It made but little progress until about 1845, when Mr. Heinrichs and Dr. Kehr brought it to our Hermann vine-dressers.

This little insignificant-looking grape, pronounced worthless by Longworth, the father of American grape culture, has, nevertheless, become *the* great and leading variety for red wine not merely in Missouri, where its superior qualities were first appreciated and brought out in full splendor, and in its native State, Virginia, where it is now receiving great attention, hundreds of acres being planted with this most valuable variety for wine,—but, far and near, in many sections of this country, and even in some parts of France where American vines are planted.

The Norton, with its twin-sister, the Cynthiana, is now recognized by all experienced

grape-growers as *the most reliable* and *best red wine grape* of America. Except in size of berry, it has also most qualities of a very good table grape; it is sweet and spicy, and is unexcelled as a long keeper.

The illustration of the Cynthiana, page 112, equally serves as a good representation of the Norton-grape. Many grape growers consider both identical.

The *bunch* of the Norton is long, compact, and shouldered; *berry* small, BLACK, with dark bluish-red juice, almost without pulp when fully ripe; sweet and brisk. Ripens late, in October. Vine vigorous, healthy, rarely attacked by black rot and evidently less subject to it than most other varieties, hardy, and productive when well-established, but very impatient of transplanting, and exceedingly difficult to propagate. *Roots* tough and wiry. Liber thin and hard; canes vigorous, of medium thickness and good length. Wood *very* hard, with a small pith and firm outer bark.

Whenever the season will admit of a thorough and perfect ripening of its fruit, the Norton will succeed here in almost any soil; but, when the wood and buds have not fully ripened in the fall, the vine is liable to suffer from severe cold during the succeeding winter. In rich bottoms it comes early into bearing and is enormously productive; on high hills with rather poor soil and southern aspects it is tardy in coming into bearing, but produces there the richest wine, of great body and superior medical qualities.* It has quite a peculiar coffeine flavor, which at first seems unpleasant to many, but which, like coffee, endears itself to our taste. Must 105°–110°. Mixed with the *Montefiore* it makes a more palatable wine, not as heavy and astringent, for general consumption.

From Norton's seed two *white* grapes have been raised almost simultaneously: one by old Langendorfer, sen., at Hermann, Mo.; the other by J. Balsiger, of Highland, Ill. They are *very late*, ripening even later than Norton's, and thus will not be adapted to locations north of St. Louis.

Norwood. (*Labr.-Hybr.*) Originated by N. B. White, of Norwood, Mass., from Labrusca crossed with Black Hamburg; first exhibited in the fall of 1880, before the Mass. Horticul. Society, it received a first-class certificate of merit for some very fine bunches. It is said to make a larger cluster and larger berry and to ripen a little earlier than Concord; is not a strong grower, making but few imperfect bunches; in quality from good to best; superior to the Concord; while at some experiment stations the Norwood proved very desirable producing large double shouldered bunches and berries resembling *Lindley*, bright AMBER in color, productive and a good table and market grape.

*It is the great remedy here for dysentery and diseases of the bowels.

Occidental. (*Labr.-Hybr.*) Produced by N. B. White, of Norwood, Mass., from wild Labrusca seed crossed with Black Hamburg. A very compact cluster of a DARK RED grape, deserving to be better known.

Ohio. (*Est.*) Syn., CIGAR-BOX, LONGWORTH'S OHIO, (BLACK SPANISH ALABAMA?) is supposed to be identical with the "Jacques" or "Jack" introduced and cultivated near Natchez, Miss., by an old Spaniard of the name of Jacques. It originated from a few cuttings left in a cigar-box, by some unknown person, at the residence of Longworth, of Cincinnati, Ohio. This variety attracted a good deal of attention for some time on account of its large, long *bunches* (often ten to fifteen inches long, rather loose, tapering, shouldered), and its good quality; its *berries* are small, round; skin thin; PURPLE with a blue bloom; flesh tender, melting, without pulp, brisk and vinous. The wood is strong, long-jointed, lighter red than that of the Norton, and smooth, with peculiarly pointed buds. Leaves large, tri-lobed. At first it was also a good bearer, but soon mildew and rot affected it so badly that it was of no use, even when grown on walls with protection. Downing ("Fruit and Fruit-trees of Am.") said, "it is most likely a foreign sort, and, except in a few locations, a *sandy soil*, and a mild climate, it is not likely to succeed." Geo. W. Campbell, whom we have to thank for valuable information on this and many other varieties, says: "I always considered the Ohio or Cigar-box, from its fruit, habit of growth and foliage, as of the same FAMILY as Herbemont, *Lenoir*, Elsinburgh, and that class of small, black southern grapes." Samuel Miller, of Bluffton, Mo., wrote us: "The Cigar-box, or Longworth's Ohio, I had in the East for years, but never grew a perfect bunch. It was not hardy in vine, and the fruit both mildewed and rotted."

When ripe it is an excellent grape. A few vines sent years ago, under the names of "*Jacques* or *Ohio*," to France, by P. J. Berckmans, of Georgia, proved very fine and valuable, resisting Phylloxera, having remained healthy in the midst of vineyards destroyed by the root-louse. (See Lenoir.)

In August, 1876, G. Onderdonk gave us the subjoined information concerning the supposed identity of the Black Spanish, Ohio and Jacques:

"There lived at Natchez, in Mississippi, an old Spaniard by the name of Jacquez. He originated a grape to which he gave *no name*. Some persons got hold of it and called it the Jacquez grape, simply to designate it as old Jacquez's nameless grape; others called it the *Black Spanish* grape, as it came from the old Spaniard's garden. Then a traveler, whose name was never obtained, carried some cuttings of this grape to Cincinnati, where he left them with a nurseryman (Mr. Longworth!) there, packed in a cigar-box; thus it came that they were designated as the 'Cigar-box grape,' *not as a name*, but to designate it till its true name would be known. This nameless variety circulated about Ohio, and, carried from that State, took the name of *Ohio* with those thus obtaining it. Finally, as no authoritative name appeared, each called it the Black Spanish, Jacquez, Cigar-box, or Ohio, according to the several temporary designations."

"I at first got it from a neighbor, who obtained it from Berckmans, in Georgia, as the Cigar-box. I afterwards heard of the Black Spanish as a wonderful grape, and procured it from Gonzales, Texas, and several other Texan sources. I got

afterwards information from different sources that these four names represented the same grape. I cannot now remember from whom I got the history of the old Spaniard Jacquez and of the various names having originated as I have stated; but I am altogether satisfied (from examining the matter for several years) of the identity of Black Spanish, Jacquez, Cigar-box and Ohio."

"If there is any valuable difference between the *Black Spanish* and *Lenoir*, it is in favor of the latter."

In August, 1892, however, Onderdonk wrote us that, having obtained from Campbell a plant of the "*Ohio*" or "*Cigar-box*," he can testify that *his* "OHIO" is distinct from the variety cultivated in Texas under the names of Black Spanish, El Paso, Jacquez, etc.

Omega. (*Labr.* ×) Originated by that successful producer of hardy varieties of high quality, the late John Burr of Leavenworth, Kansas; from what source this and some others came he even could not say, as the seed was mixed. The vine is vigorous, hardy and prolific; it has never shown any liability to rot or mildew on his grounds; the *bunch* is of medium size only, rather short and compact; the berries are very large, dark RED with tender pulp, juicy, sprightly and sweet; quality best; ripens about with Concord.

Omega, (*Labr.*) an old Catawba Seedling, abandoned.

Onderdonk. (*Æst.*) This delicate white grape is a pure seedling of Herbemont, originated by T. V. Munson, in 1886, and named in respect to his friend and co-laborer in the improvement of our native grapes. In leafing out, flowering, ripening fruit and shedding foliage it is very late, preceeding Herbemont a few days only. Growth very vigorous, leaves somewhat larger and more deeply lobed, not quite so firm and leathery as those of its parent; it is less afflicted by black rot (but sometimes attacked by Ripe Grape Rot [?] which does not trouble Herbemont.) It endures cold equally well with Herbemont and will probably succeed in about the same regions where the Herbemont does. The vine is a sure and abundant cropper; its cuttings root more readily than with Herbemont; the wood is somewhat darker with a little longer joints. *Cluster* large, compound, compact, conical; *berry* a shade larger than in Herbemont, of light GREENISH-YELLOW color, translucent; skin thin, tough; pulp melting, very juicy, pure, sprightly, sweet; seeds small, 1 to 3; it is an exquisite dessert and white wine grape. We consider it very promising for the South Atlantic and South Central States. The illustration, made specially for the Bushberg Catalogue, was photographed from nature. (See next page, 166.)

Oneida. (*Labr.-Hybr.*) Said to be a seedling of MERRIMACK (Rogers' No. 19), raised by Thacker, of Oneida county, N. Y., who states that the vine bore its first fruit in the fall of 1875, when four years old, and is a strong, healthy grower, free from disease; *wood* short-jointed, and ripens well; a good bearer; *bunches* medium size, evenly shouldered, sufficiently compact; *berries* large, twice the size of Delaware, which it resembles in color; skin brittle, with a delicate bloom. It ripens on the original vine gradually from the 10th to the 25th of September. Keeps well and does not drop from the stem. A. M. Purdy, Palmyra, N. Y., who introduced this sort on subscription, to be delivered in the spring of 1884, thought that the Oneida would prove *the best and longest winter-keeping grape* introduced.

Onondaga. (*Labr.-Hybr.*) Originated in Fayetteville, Onondaga Co., N. Y.; a cross between the Diana and the Delaware; said to combine in some degree the flavor of both, ripening at the same time as Delaware, and to be a late keeper. Its appearance is certainly very fine, resembling Diana. Should it prove as good and healthy as its originator claims, it would indeed be a valuable acquisition as a market grape.

Opal. (*Labr.-Hybr.*) Lindley Seedling, produced by T. V. Munson, see page 159.

Oporto. (*Rip.*) Of the same character as Clinton; a true native with a foreign name. *Bunches* small, usually very imperfect; *berries* small, BLACK, harsh, and very acid. Considered a very poor variety by Fuller. "Of no value, a complete humbug."—*Husmann.*

Regarded as a valuable wine grape by Gov. *R. W. Furnas*, of Nebraska, who says (Report to Am. Pomol. Society, 1871), "My vines (of Oporto) have never failed to give a fine crop; last year I picked *eleven hundred* good bunches from *one* vine five years old. It is an exceedingly rampant grower, and, as a rule, the bunch not compact, bearing the fruit on until after first frost in fall. I have found the Oporto to give a first-class yield of very good wine—greatly improved by age."

The difference of opinion is attributable, no doubt, to differences in soil, etc.; in a granitic, shistose (slaty) soil the Oporto flourishes best, while in alluvial soil it loses its foliage. In some parts of France it was used as a Phylloxera-resisting grafting stock.

Oriental. (*Labr.-Hybr.*) Produced by N. B. White, of Norwood, Mass., from a wild Labrusca seed crossed by Black Hamburg. A fine DARK RED market grape.

Oriole. (*Linc.* × *Æst.*) See Munson's Hybrids, best quality, but very late, page 159.

Osage. (*Labr.* ×) Originated by the late John Burr from seed of Concord. Vine vigorous, hardy and productive, but rots also, about like Concord. *Bunch* large, shouldered; *berry* very large, larger than Concord, BLACK; somewhat pulpy, juicy, sweet, sprightly; considered better in quality and ripens about a week earlier than Concord. Our old friend Sam. Miller said in Colman's *Rural World*, "Osage, a large black grape, I think valuable."

Osceola. (*Labr.* ×) Raised by Dr. J. Stayman, from seed of his friend Burr's STANDARD grape. It is a very strong handsome grower, hardy and productive; foliage strongly labrusca; has shown neither rot nor mildew so far; bunch medium, compact; *berry* WHITE, rather large, tender, but skin very firm; meaty, sprightly sweet with some of the native aroma; ripens very early, with Jewel. A fine table grape of a new type.

Osee. (*Rip.* ×) Originated by John Burr, deceased, of Leavenworth, Kan.; when and from what parent seed is not recorded. The vine is immensely productive, vigorous and hardy; never mildewed or rotted on his grounds. Bunch medium, short, shouldered, compact; berry very large, WHITE, tender, very juicy and of a peculiar flavor. Seems to be a very valuable grape for white wine and for jelly.

Oskaloosa. (*Æst.* ×) Originated by Dr. J. Stayman, of Leavenworth, from *Delaware*. *Vine* vigorous, hardy, healthy and productive; has shown neither rot nor mildew so far. Bunch medium, compact; berry large, BLACK, pulp tender, juicy, sprightly, vinous sweet, quality best; ripens very late, after Ozark, and will hang on the Vines long after ripe. The originator says: This grape requires a favorable location and a long season to mature here.

Osmond. (*Rip.*) A seedling from FRANKLIN, raised by O. T. Hobbs, Randolph, Pa. Bunch and berry small, round, BLACK, blue bloom; vinous, harsh.—*Mitzky, Our Native Grape.*

ONDERDONK.

Oswego. (*Labr.*) A unique very large BLACK grape of unknown origin; named and introduced by Dr. J. Stayman, of Leavenworth, Kan. Vine vigorous, hardy and productive; has shown neither rot nor mildew so far. Bunch and berry very large, handsome, with but little pulp and native aroma; ripens with Concord, which it resembles in color, but is considered by Dr. Stayman to be there better in quality and hangs on the vines long after ripe.

Othello. (*Rip.-Hybr.*) Arnold's No. 1. A cross from Clinton, or what is called Clinton in Canada, fertilized by the pollen of Black Hamburg. Described as follows: "*Bunch* and *berry* very large, much resembling the Black Hamburg in appearance. BLACK with a fine bloom. Skin thin, the flesh very solid but not pulpy; flavor pure and sprightly, but in the specimens we have seen rather acid. Ripening with the Delaware."

The "Ampelographie Américaine," describes the OTHELLO as follows: (Translation.)

Vine vigorous, of half-erect growth. *Cane* of medium length, somewhat slender, round, shining, and but little wrinkled; of yellowish-brown color when the wood is ripe, darker on the nodes and portions exposed to the sun; with elongated internodes, heavily striated; intermittent 2-forked tendrils. *Buds* covered w th russet hair, not numerous and falling early. In opening the buds become whitish and show the flower-bunches fringed by a fine wooly down with a carmine border on the surrounding foliage, which opens and expands rapidly; these leaves are distinctly three-lobed, sometimes five-lobed, whitish on their lower face with isolated rosy points on their outline, deeply dentate and glandular. *Foliage* large when full grown, three-lobed with a narrow bay at the leaf-stalk (sinus pétiolaire), the borders of the lobes overlapping; with two series of very sharp teeth; upper face dark green, lower face of a whitish-green with a wooly down arranged in small tufts on the lower veins. Leaf-stalk very short, robust, and forming an obtuse angle with the plane of its limb or cane.

Then follows a description of the *flowers* or blossoms in terms which we are scarcely able to translate; then of the *bunch* with its peduncles and pedicles; of the *berries*, their size, shape, color, skin, pulp, juice, taste, aroma, etc., with a minuteness and exactness which may interest the scientific specialist, but for which we have not the space, nor, as practical grape-growers, the time to study them. To us it would be more important to know the conditions of soil and climate which the variety demands, whether it inclines to or resists diseases, where and how it succeeds, etc.

Our experience with it has not been as favorable as we expected. The vines proved good growers, with beautiful, large, deeply-lobed smooth foliage, but not very productive, and what fruit it produced was often destroyed by rot. Here the bunches by no means resemble the Black Hamburg in appearance, nor are they with us as good in quality as Arnold's other hybrids.

In France, however, the Othello does exceedingly well, is enormously productive, and pleases so well in quality and appearance that it is largely propagated and in demand; at Nimes, and wherever tried it has proved sufficiently resistent to the insect.

At a meeting of the Agricultural Society of the Herault, at Montpellier, M. SABATIER stated, that eight years previously he had received from Bush & Meissner one dozen OTHELLO plants; his neighbors had taken some, which also has succeeded admirably, and of those which he kept for himself he was offered last year 1500 francs per 1,000 cuttings; such offers he could not well refuse, and the purchasers thanked h m besides!

M. PIOLA also stated that his Othellos were prospering; 300 vines, the third summer, gave him 200 litres wine. Some consider the Othello wine the most remarkable of American wines; that it is destined to take the place of the *Malbec* in the Bordelais; others say that the wine made of Othello, though at first too acid, becomes very refreshing and agreeable, equal to the best ordinary wines of the lowlands of France.

M. GAILLARD states: The Othello succeeds well notwithstanding a little mildew; the great wine merchants compare its wine to the mountain wines. M. FOEX and IM THURN think this variety not yet sufficiently tested; it commences to fail at the experimental gardens of the former, hence the very high price paid for them is not justifiable, and caution is advisable.

Owasso or Owosso. (*Labr.*) A Michigan seedling, supposed to be from the Catawba; somewhat similar to Catawba; its bunch and berry are large, though with shorter clusters and earlier in season. Goodhue, the originator of this grape, claims that it combines the following desirable qualities, viz.: Hardiness, size, beauty, quality, productiveness, and adaptation to the climate of the Northern States. Fruit clusters large and compact; quality excellent; has a sprightly taste. A good keeper. Color DARK AMBER. Ripens with the Delaware.—*Monroe Co. Nurseries.*

The Horticulturist of the Experimental Farm at Ottawa finds it hardly to be commended; imperfectly fertilized, fruit apt to mildew and a poor keeper.

Ozark. (*Æst.* ×) A seedling originated by Dr. J. Stayman, of Leavenworth, Kan. It is a mystery to us, he says, whence the seed came, but all the seedlings from this variety appear to be of the Æstivalis type. Vine remarkably vigorous, hardy and productive; has never shown any trace of either rot or mildew on our ground. Bunch large, shouldered, compact; berries rather large, BLACK with a heavy bloom; meaty, tender, sprightly sweet, with a peculiar pleasant flavor, unlike any grape! ripens later than Concord and will hang on the vines until hard frost; it makes a very fine dark red wine of Æstivalis character, in the originator's judgment better than Norton's and requiring a different method of wine-making. (?) Rather mysterious, Dear Doctor.

Mr. Van Trump reports in the *St. Louis Journal of Agriculture:* "Ozark is the most remarkable grape in the entire collection. The bunch is much larger than Concord and the berry as large; but its vigor is most wonderful. I saw a single vine covering a trellis forty feet long, of one season's growth, and beneath the luxuriant foliage the beautiful clusters hung in the greatest profusion." Judge Miller says: "Ozark will have a record when known. It will make an extra good wine."

Palmer. A large BLACK grape, said to have been originated in New York by a Mrs. Millington, who subsequently removed to South Haven, Michigan, and brought the unknown variety with her. It is a large black grape, and from its trial there seems likely to prove desirable as a market grape; but may probably prove an old variety.

Paradox. (*Labr.* ×) A seedling of Hartford × Iona, raised by W. D. Barnes, of Middlehope, N. Y. *Vine* vigorous and productive: foliage good; *bunch* medium or above, compact, shouldered; *berry* medium size, BLACK or dark PURPLE with blue bloom, pulp separates readily from the seeds, is juicy, sweet, vinous, and pure flavored of very good quality; ripens with Concord or a little before. *Report of New York Experiment Station 1892 and 1893.*

Paragon. (*Labr.* ×) Originated by John Burr (one of his last productions), from mixed seed. Vine very vigorous, hardy, healthy and productive; supposed to be free from rot and mildew. Yields well. *Bunch* medium to large, shouldered, compact, handsome; *berry* large, BLACK, tender and *very* juicy, a bag of juice, which is sweet, sprightly, rich; ripe with Concord, but will hang on the vines long after ripe. Our friend Sam. Miller, of Bluffton, Mo., reported it as only medium in bunch, but berry very large, BLACK, of excellent quality, superior to Concord; a delicious and valuable market grape.

"We consider it worthy of further trial as a table grape."—*S. A. Beach, Horticulturist*, N. Y. Experiment Station, 1892–1893.

Paragon. (*Labr.-Hybr.*) Originated by Chas. S. Copley from seed of Telegraph × with Black Hamburg. The vine is medium in growth; the leaves are of a dark, dull green, three to five

lobed; it has short-jointed dark brown wood. The bunch is very large; berries also, some one inch in diameter, BLACK, sits rather close. The quality is first-rate, as good as Hamburg; the flesh as meaty as a raisin-grape, keeping well until January. Rotted slightly in bad seasons.

This is an instance of duplicated names, which might be avoided in future by the aid of this Catalogue, but cannot well be remedied now, as Mr. Copley justly claims priority. He has exhibited it, winning premiums under this name, many years ago, and the late Mr. Burr, who might have been willing to change the name, lives no more.

Pauline. (*Æst.*) Syn., BURGUNDY OF GEORGIA, RED LENOIR. A Southern grape, of the Lenoir family. Said to be superior for both wine and the table. Of little value here and at the North, where it does not ripen or grow well. *Bunch* large, long, tapering, shouldered; *berries* below medium, compact, PALE AMBER OR VIOLET with a lilac bloom; flesh brisk, vinous, sweet and aromatic. "The most delicious grape we have seen."—*Onderdonk.*

Growth moderate and peculiar; comes late into bearing; sometimes sheds a part of its leaves too early. Onderdonk believes it to be a hybrid and *not* a pure Æstivafis. (See also Bottsi.)

Pawnee. (*Æst.* ×) Originated by Dr. J. Stayman, of Leavenworth, Kan., from the same lot of seed as *Ozark*. Vine very vigorous, hardy and immensely productive. Subject to rot some in unfavorable seasons. *Bunch* very large, double shouldered, compact; *berry* large, BLACK; meaty yet sprightly sweet, of the same peculiar flavor of Ozark; ripening later than this variety and of better quality. Promises to make a very fine dark red wine, requiring proper treatment.

(Doctor! Doctor! If the Ozark is better than Norton, and the Pawnee of still better quality than Ozark! This seems too good to believe!)

Paxton. (*Labr.*) See Concord Seedling, p. 107.

Payne's Early. (*Labr.*) See Isabella, page 141.

Peabody. (*Rip.*×) A seedling of *Clinton*, fruited by Jas. H. Ricketts. He says, "It is hardy in vine and fruit; bunch medium to large and quite compact; berry the size and shape of Iona, oval form predominating, BLACK with blue bloom; flesh tender, juicy, rich, and sprightly. The fruit is unlike that of most other grapes now cultivated; first-class in every respect." It has not been distributed nor tested in the West, as far as we could learn. At the Experimental ground of Ottawa, Ont., Canada, it ripened about same time as Worden, being juicy, acid, with a peculiar breaking quality of flesh; seeds large. Vine a fair grower.

Pearl. (*Rip.-Hybr.*) Rommel's Taylor Seedling No. 10. Valuable in some localities both as a table and a wine grape. *Bunch* medium, shouldered, compact; *berry* medium, round, PALE YELLOW covered with a delicate bloom; skin thin and transparent; pulp soft and melting, juicy, sweet and high-flavored. Vine a strong grower, of short-jointed, grayish wood, with bright green leaves; not very productive, but averaged in 1893 ten pounds of fruit for each vine in N. Y. Experiment Station; healthy and hardy, but prone to mildew. Ripens with or after Concord.

Pedee. (*Rotun.*) See Sub. Var. of Scuppernong.

Peola. (*Labr.* ×) One of John Burr's many valuable seedlings, raised on his grounds near Fort Leavenworth, Kan., from mixed seed. Vine vigorous, hardy, healthy and productive; supposed to be free from mildew and rot; has not shown any so far. Bunch medium, compact, handsome; berry medium, BLACK, very tender, juicy, sprightly and sweet, of fine quality; ripe about with Concord. A good table grape.

Perfection. (*Labr.* ×) A seedling from Delaware, originated by Dr. J. Stayman, at Leavenworth, Kansas. Vine vigorous, hardy and very productive; its growth and foliage is strongly of the Labrusca type; and has shown neither rot nor mildew so far. Bunch handsome, long, compact, shouldered; berry medium, RED, tender, juicy, sprightly, vinous sweet with some native aroma; quality very good; ripens very early, about with Jewel, say one week before Hartford.

Perkins. (*Labr.*) Origin, Massachusetts. A very early market grape, which is more important for our markets than fine quality; besides, tastes differ, and to many tastes its strong fox or musk flavor is not disagreeable. Vine a vigorous grower, with thick leathery leaves, healthy and productive. *Bunch* medium to large, shouldered; *berries* medium, oblong, often flattened by their compactness; GREENISH-WHITE at first, then of a fine, pale lilac or reddish color when fully ripe, with a thin white bloom; flesh rather pulpy, sweet, juicy, not melting; skin thick; ripens a few days after Hartford and before Delaware.

It is one of the surest grapes we cultivate, succeeding remarkably well, and is more *free from rot* than any other Labrusca variety. It is also not without value as a wine grape; its foxy taste and odor grow less the older the wine becomes, and can be improved by galliseing, or, better still, by blending with other white wines. The grape has, however, no merits as a keeper, shrivels and loses flavor rapidly.

Perry. (*Linc.* × *Æst.*) See Munson's Seedling, p. 159.

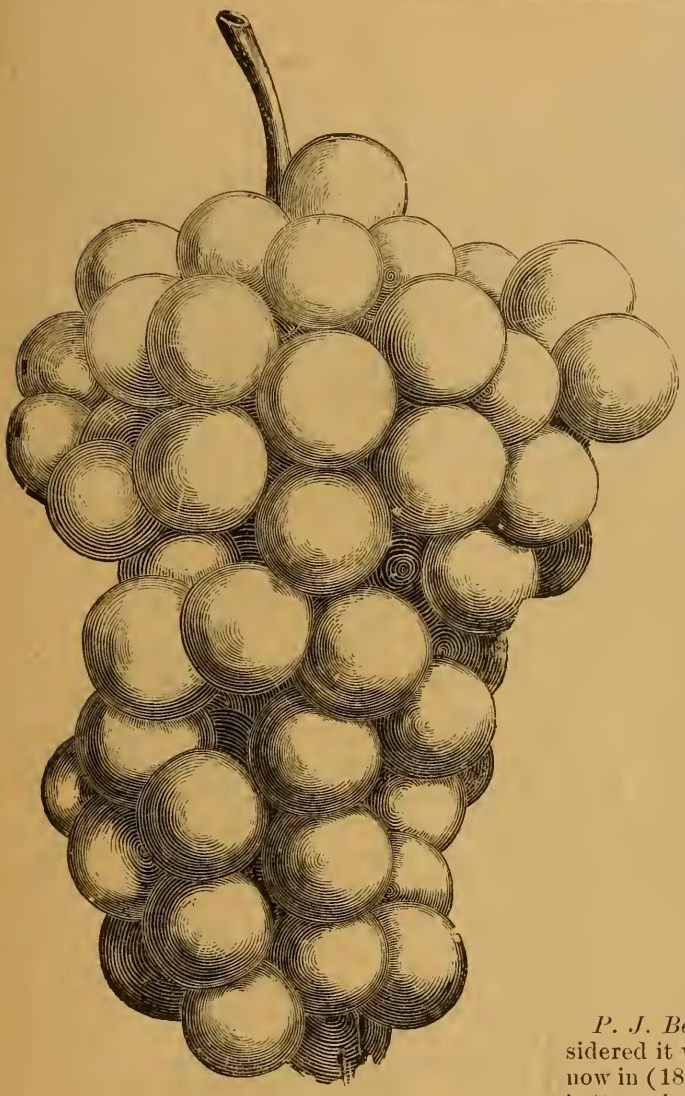
Peter Wylie. (*Labr.-Hybr.*) See Dr. Wylie's Grapes.

Pierce. Syn., ISABELLA REGIA, a sport from *Isabella*, originating about the year 1881 with Mr. J. P. Pierce, of Santa Clara, Cal. The vine is an exceedingly strong grower and prolific bearer; the foliage is remarkably large; the clusters are of good size; the berries like the leaves of extraordinary size, twice as large as those of its parent, BLACK with light bloom, and when ripe are exceedingly sweet, delicious and slightly aromatic, the pulp readily dissolving. Mr. Pierce had it in cultivation under every condition and it has remained constant, showing no indication of running back to the parent. The entire crop of two acres has been shipped to San Francisco for many years past under the name of *Isabella Regia*, and always realizes the highest market price.

(Bailey's Annals of Horticulture, 1892.)

California's soil and climate is peculiarly adapted to produce fruit of great beauty and large size; sports like Pierce's Isabella might probably occur there from other Eastern varieties; but we doubt that wine-grapes equal to ours, as rich in flavor and aroma, can be grown there. Some explorers think that *New Mexico* (Valencia) will some day produce our best grapes. What does Fr end Munson say? What the Agricultural College at Albuquerque?

Pioneer. (*Labr.*) See Isabella, page 141.



PERKINS.

Pizarro. (*Rip.-Hybr.*) One of Ricketts' Clinton seedlings crossed with foreign (Vinefera); foliage resembling the Clinton; productive. *Bunch* long, rather loose; *berry* medium, oblong, BLACK, juicy and spicy, with a very fine aroma.

J. H. Ricketts says: "I have fruited the Pizarro many years and thoroughly tested it for wine-making purposes. It makes a light red summer wine of great richness." Not very desirable in the West.

Planet. (*Labr.-Hybr.*) Mentioned by Prof. Husmann as one of the foremost of Ricketts' seedlings, otherwise entirely unknown. Described in his "American Grape-growing" as follows: Concord and Black Muscat of Alexandria — healthy and productive; *bunch* large, loose, shouldered; *berry* large intermixed with smaller ones which have no seed, oblong, very tender pulp, juicy, sweet, fine flavor with slight taste of the Muscat.

Pocklington. (*Labr.*) Syn., "GOLDEN POCKLINGTON." A seedling from Concord, originated by Jno. Pocklington, at Sandy Hill, Washington county, N. Y., first exhibited at Rochester, N. Y.. in 1877; one of the largest and most attractive white grapes of *purely native* origin. *Vine* a strong grower and very hardy, with large, leathery, pubescent foliage similar to Concord: free from mildew. *Clusters* large and showy, weighing sometimes as much as one pound each. *Berries* very large, PALE GREEN with yellow tinge, a GOLDEN color when fully ripe, round and thickly set on the bunch; flesh tender, juicy and sweet, with little pulp. Seeds small for so large a grape. Ripens a week or ten days later than the Concord, and when fully ripe is better flavored than Concord, but is too late for far Northern regions. It has less of the Labrusca character (foxiness) in the taste than in the smell, and seems to have better keeping and shipping qualities than the parent. Being considerably larger in bunch and berry than Martha, more attractive to the eye, of good quality (though not best) and very productive, this is *one of the most popular varieties for vineyard culture;* a very satisfactory and profitable grape FOR MARKET.

Samuel Miller says: "While the *Martha* has done nobly — thousands of acres are planted with it, and I need not be ashamed of having originated it — I now resign and give the palm to Mr. Pocklington."

P. J. Berckmans, on the other hand, considered it worthless in his locality. He writes now in (1894): "Pocklington has lately done better, given more favorable results in many localties than when first introduced."

It was first exhibited at the New York State Fair held in Rochester in 1877, and has been justly awarded FIRST premiums at various exhibitions *every* year since. From what we have seen and heard of this grape, we are satisfied that it will become a favorite among grape-growers, for market and family use, wherever the Concord is successfully grown.

Pollock. (*Labr.*) Raised by Mr. Pollock, Tremont, N. Y. *Bunches* large as Concord, compact; *berries* large, DARK PURPLE or BLACK: flesh free from pulp, vinous, not too sweet.—*Strong.*

Potter. (*Labr.?*) Syn., POTTER'S EARLY. Origin unknown. Said to be a chance seedling from Rhode Island: resembles Cottage quite closely. Bunch compact, medium size, not shouldered; berry large, skin thick, BLACK and pulp rather tough. A grape for the far North, ripening about with *Champion;* much better in quality.

POUGHKEEPSIE RED.

Poughkeepsie Red. (*Labr.-Hybr.*) This grape originated by the late A. J. Caywood, from Iona crossed with mixed pollen of Delaware and Walter. It is an admirable grape both for its beauty and fine quality; but a weak grower and often winter-killed. *Cluster* above medium, compact and well-shouldered; resembles Delaware more than any other variety, but is about one-third larger, rather darker RED with less bloom; quality best; no pulp, melting like Iona. Claimed to be very valuable as a wine grape. It ripens very early, with Hartford, and keeps a long time after being removed from the vine, tasting like raisins when shrivelled. As a dessert fruit it is considered by some good judges as equal to fine European grapes, but worthless north; a failure at the Michigan Experiment Station, South Haven.

Although known on the Hudson for over thirty years, and exhibited at New York State Fairs, it has been but little tested and not disseminated outside.

Its parentage does not give confidence of success except where the Delaware and Iona can be successfully grown, and that is—in localities few and far between.

Powell. (?) See Bland, page 93.

THE PRENTISS.

Prentiss. (*Labr.*) A seedling of Isabella raised by J. W. Prentiss, Pultney, N. Y. *Vine* hardy, not a strong grower, inclined to over-bear; wood rather short-jointed. *Leaves* large, yet tender here; slightly downy; as healthy as those of Catawba, Isabella or Diana, resembling the latter. *Bunch* medium, seldom shouldered, compact. *Berry* medium, round, inclined to oval; skin not very thin; GREENISH-WHITE, pale yellow when fully mature, sometimes with a slight rosy tint on side most exposed to the sun, with a thin whitish bloom; seeds few, small, dark; flesh with a slight pulp, tender, juicy, sweet and pleasant; of musky aroma. The berries adhere well to the peduncle and keep well. Ripens at same time as Concord. A valuable market grape for some special localities *where it succeeds*.

T. S. Hubbard, Fredonia, N. Y., who introduced this grape, says: "We do not expect it will succeed everywhere, nor do we claim it to be a grape that will succeed over as wide a range of territory as the Concord, but we recommend it as a VERY PROFITABLE *market grape* for good grape localities."

It does not succeed in vineyards of the lower Missouri and Mississippi valleys, and its parentage does *not* encourage extensive trials in this section, nor is it commended in others, excepting the Experiment Station of Georgia.

Primate. (*Labr.* ×) Originated by John Burr from mixed seed. Vine vigorous, hardy, healthy and productive. Has shown neither rot nor mildew so far. Bunch long, compact, handsome; berry medium or above, BRIGHT RED, pulp tender, juicy, rich, sprightly, vinous; quality best; ripens a little after Concord. A very promising grape.

Progress. (*Labr.Hybr.*) Originated by A. F. Rice, in South Weymouth, Mass.; transplanted by him afterwards to Griswoldville, Ga., where it is said to make a good growth; holding its leaves well on healthy, short-jointed wood, producing a DARK RED grape of fine quality, medium in size of bunch and berry; ripening two weeks earlier than Concord, and thought to be well worthy of a trial. Not tested as far as we are informed.

Prolific. (*Labr.* ×) Origin unknown; named by Dr. Stayman, describing it as follows: Bunch very large, double shouldered, rather compact; berry large BLACK; ripens a few days after Jewel; Vine surpassing it in vigor and productiveness; is so far free from rot and mildew; clusters hang on the vines until they become like raisins.

Pulasky. (Seems to be of the Riparia class.) One of the remarkable seedlings raised by the late John Burr from mixed seeds. Vine vigorous, hardy and productive; seems also not liable to either rot or mildew; bunch medium, compact; berry medium, BLACK, with slight bloom; pulp tender, juicy, sweet and sprightly vinous, of good quality; skin thin. Not disseminated up to 1895.

Pulpless. (*Hybr., Labr.* × *Vin.*) Originated by C. Engle, of Paw Paw, Mich. A seedling of Rogers' Salem. Vine a strong grower, hardy and productive. Bunch medium to large, long, often shouldered; berry BLACK, large to very large, oval; more vinous than sweet; to the taste the seeds seem to be floating in the juice; quality nearly best; ripens with Concord.

Purity. (*Æst.-Hybr.*) A cross upon Delaware, produced by Geo. W. Campbell, is a small GREENISH-WHITE, or very light yellow grape of the finest quality. It is a stronger grower and has healthier foliage than the Delaware. It ripens its fruit eight days earlier than that variety. Campbell gave it that name on account of the purity of its flavor, which is even more exquisite than that of the Delaware. He says: so far as quality is concerned it is probably unexcelled by any variety grown, its only fault being its small size. The vine seems to have inherited from its parent, the Delaware, its remarkable exemption from rot. It is so difficult to propagate, and its clusters are so small, that friend Campbell ceased growing it and regards it of value for the amateur only in a collection of varieties of American seedlings. We recommend it to those who plant for their own use and pleasure and are willing to compromise size for fine quality.

Purple Bloom. (*Labr.-Hybr.*) A seedling of *Hartford* crossed with *Gen. Marmora*, raised by Dr. Culbert, Newburgh, N. Y. *Vine* hardy and vigorous, a prolific bearer; its *bunches* are large and showy; *berries* of fair size and good quality. Well adapted for a good market grape. Exhibited 1877. Not disseminated.

Putnam, (*Æst.-Hybr.*) or Ricketts' Delaware Seedling No. 2. Cross between Delaware and Concord; very early, sweet, rich and good. Must stood 80° saccharometer; 4½ per mille acid. Not disseminated, we believe.

Quassatek. (*Rip.-Hybr.*) A cross of Clinton and Muscat-Hamburg, by J. H. Ricketts, of Newburgh, N. Y. It has a large *bunch* shouldered: *berries* above medium, oval, BLACK with a blue bloom; flesh very sweet, juicy and rich; vine healthy and productive.—*F. R. Elliott.*

One of the prettiest vines ever seen, filled with large bunches.—*Husmann.*

Raabe. (*Æst.-Hybr.*) Some say it is a hybrid between Labrusca and Æstivalis or Vinifera, but *Strong* describes it as a cross between Elsinburg and Bland, which is probably correct. Raised by Peter Raabe, near Philadelphia; thought to be hardy, but was only moderately vigorous, and proved quite unprofitable. *Bunches* small, compact, rarely shouldered; *berry* below medium size, round, dark RED, thickly covered with bloom; flesh very juicy, with scarcely any pulp; flavor saccharine with a good deal of the Catawba aroma; quality "best."—*Ad. Int. Rep.*

Racine. (*Æst.*) Of similar origin as *Neosho*, and at firs supposed to be the same grape, but afterwards recognized as distinct. We cannot admire either of these two varieties. They are both healthy and hardy, and have a beautiful durable foliage which makes them desirable for arbors, but we find neither of them very productive or desirable in quality. Its wine has a medicinal taste and flavor; the small berries are pulpy and full of seeds. They may be better in quality and sufficiently productive in some more Southern localities.

Ragan. (*Linc.* × *Æst.*) See Munson's Seedlings, p. 159.

Randall. (*Hybr.?*) A chance seedling, originated in Randall's garden, at Bayonne, N. J., more than twenty years ago, and now only introduced by Peter Henderson & Co., New York, who furnish the following description: Vine has long-jointed, pretty hard wood; bunches large, often shouldered; berries very large, RED or MAROON color; skin thick, little pulp, sweet, and has the aroma of white wine; ripens a little before the Concord. Is subject to mildew.

Raritan. (*Labr.* × *Æst.*) Ricketts' Delaware Seedling No. 1. A cross of Concord and Delaware. Plant moderately vigorous, hardy, short-jointed; *bunch* medium, shouldered, nearly the same form as Delaware; *berry* small medium, round, BLACK; leaves of medium size, lobed, veined or corrugated; flesh juicy and vinous; ripens about the time of Delaware, and commences to shrivel as soon as ripe. Its originator, J. H. Ricketts, of Newburg, N. Y., claims that this is a superior wine-grape, its must coming up to 110° on Oechsle's scale in 1881, and 7½ mille by Twichell's acidometer. In 1871 Ricketts reported to the Am. Pomol. Society, 105° saccharometer, 9½ acid; "of course, too much acid."

The vine does not grow vigorously on its own roots, and, according to Ricketts' experience, it grows best when grafted on the Clinton; but, according to our experience, the *invigorating* effect of the stock is not of many summers' duration unless care is taken to prevent the graft from making its own roots.

Ray's Victoria. (*Labr.*) See Victoria.

Rebecca. (*Labr.*) An accidental seedling, found (1856) in the garden of E. M. Peake, of Hudson, N. Y. It is a very fine white grape, but unfortunately very tender in winter and subject to mildew in summer, of weak growth, deficient foliage. On south walls, in well protected situations, with dry soil and good culture, it succeeds very well, and produces most delicious white grapes, ripening almost as early as *Delaware*.

Bunches medium, compact, not shouldered; *berries* medium, obovate; skin thin, PALE GREEN, tinged with yellow or pale amber color at full maturity, covered with a thin white bloom, considerably translucent. Flesh tender, juicy, free from pulp, sweet with a peculiar musky and luscious aroma distinct from any other grape; seeds small; leaves of scarcely medium size, very deeply lobed, and sharply serrated. Suited to Amateur culture, but, when tried on a large scale, in ordinary vineyard culture, as a hardy profitable grape, great disappointment followed and produced a decline in grape-growing.

Red Elben. (*Æst.*) See Rulander, page 175.

Red Lenoir. (*Æst.*) See Pauline, page 168.

Red Muncy. (*Labr.*) See Catawba, page 99.

Red River. (*Æst.*) See Cynthiana, page 111.

Reinecke. (*Labr.*) A seedling of *Woodruff*, q. v.

Reliance. (*Æst.-Hybr.*) Parentage unknown. Probably a cross between Delaware and Iona. Exhibited in fall of 1881 by J. Burrows, Fishkill, N. Y. Resembles Delaware in size and color.

Rentz. (*Labr.*) A Cincinnati seedling, produced by the late Sebastian Rentz, a most successfull vintner. Claimed to be equal, if not superior, to Ives. A large, rather coarse black grape, very vigorous and healthy in vine and foliage, free from mildew, and very productive. *Bunch* large, compact, often shouldered; *berry* large, round, BLACK; flesh rather pulpy and musky, with abundant sweet juice. Ripens earlier than Ives Seedling, but is not good enough to be recommended. Berries drop from stem when ripe. Valuable as a stock for grafting. *Roots* thick, with a smooth, firm liber, readily pushing young rootlets, of strong resistance to Phylloxera; canes thick, but not very long, nor rambling.

Requa. (*Labr.-Hybr.*) Rogers' No. 28. A fine table grape. The late M. P. Wilder, who had a better opportunity than most men to form an accurate opinion of the merits of these hybrids, described it in the *Grape Culturist* as follows:

"*Vine* tolerably vigorous and quite productive; *bunch* large, shouldered; *berry* medium size, roundish; skin thin; flesh tender and sweet with a trace of the native flavor; color BRONZY-GREEN, assuming a dull brown RED at maturity; season middle of September. A grape of fine quality, but subject to rot in unfavorable seasons, ripening too late for the North."

Ricketts' Hybrids. Our Index contains a list of the very remarkable seedlings raised by J. H. Ricketts, at Newburg, N. Y., *as far as named* and disseminated by him. By his long-continued, carefully and skillfully conducted labors he has produced the most wonderful collection of hybrid grapes, many as yet unnamed and designated only by numbers. The American Pomological Society repeatedly awarded him its "WILDER SILVER MEDAL;" and hundreds of premiums from Horticultural Societies all over the country have been awarded to Mr. Ricketts for his seedling grapes.

There is no question about the beauty or the excellence of many of these grapes, and, though some have proved entire failures with us and others, especially in the Mississippi Valley, the very fact that he exhibited every year his magnificent specimens is evidence that they *can* be grown in great perfection. His location may be specially favorable, but there must be other places equally so, where the same care and attention will produce the same splendid results. His vines are not pampered nor covered with glass, as some suppose, but merely laid down without covering for winter, pruned long and cultivated with but ordinary care. We hoped, therefore, that some of these excellent varieties will become valuable acquisitions to our finest and most useful grapes, especially those which have the Concord for the pistillate parent, as LADY WASHINGTON, EL DORADO, JEFFERSON, and those which are crosses on the Clinton, as the BACCHUS and EMPIRE STATE.

Geo. W. Campbell, in his treatise on "Grapes, New and Old," delivered before the W. New York Horticultural Society in January, 1894, justly remarked: "It is greatly to be regretted that extended trial has failed to sustain the high promise of Ricketts grapes in public estimation, and few, if any of them, appear now to be regarded as having great or permanent value. It is not because of lacking in high character; nor because they cannot be successfully grown, for Mr. Ricketts was, by his wonderful exhibits, constantly demonstrating that it *could* be done. It may be that our grape-growers are not yet educated up to the point of giving the necessary care and attention to produce the same splendid results; or, perhaps, because they believed it would not pay. It may also be that there is wanting in the grapes themselves some element of hardiness requisite to adapt them to general culture."

Riesenblatt. (*Æst.*) Syn., Giant-leaf. A chance seedling of some Æstivalis grape that grew on M. Poeschel's vineyard at Hermann, Mo. The vine is hardy, healthy and productive; a strong grower, with a truly gigantic leaf. A small quantity of wine made from its grapes by Poeschel & Sherer has a Madeira character resembling Hermann; color DARK BROWN.

This variety has not been disseminated, and consequently has not been extensively tried outside of Hermann, Mo.

Riesling or **Missouri Riesling.** See page 156, also Grein's Seedlings, page 132.

Robeson's Seedling. Identical with Louisiana.

Robinson's Unnamed Seedling Grape. An accidental, found by Mrs. E. Mason, at Lamont, Mich., in 1881; bore its first crop of fruit in 1885; a moderate grower, with Labrusca foliage, slightly lobed, pubescent. Bunch medium, cylindrical, not shouldered; berry medium, round; skin thin but firm; bloom thin whitish; color REDDISH AMBER; season about with Delaware. Flesh colorless; pulp tender, juicy, vinous, sprightly, "very good," slightly foxy.

Rochester. (*Labr.* ×) One of Ellwanger & Barry's seedlings, from mixed seed of Concord, Delaware, Diana and Rebecca. *Vine* a remarkably vigorous grower and productive bearer; wood short-jointed and hardy; foliage large, thick, healthy, yet resembles that of Delaware; the habits of the vine are similar to those of the Diana, and it requires ample room and rather long pruning. *Bunch* large, shouldered, frequently double-shouldered, very compact, sometimes a little TOO compact; *berries* medium to large size, round, DARK PURPLE or PURPLISH-LILAC; peculiar, with thin white bloom; flesh very sweet, vinous, rich, and aromatic. Ripens early; (usually the first week in September; has never failed to ripen well in the worst of seasons since it first bore.)—This part of the descriptions refers, of course, to the locality of Rochester, N. Y., where it was raised. We esteem it highly and consider this variety a very desirable addition to the amateur grapes of the Labrusca class.

Rockland Favorite. (*Labr.*) See Concord Seedl., page 107.

Rockwood. See description among CONCORD Seedlings, page 107.

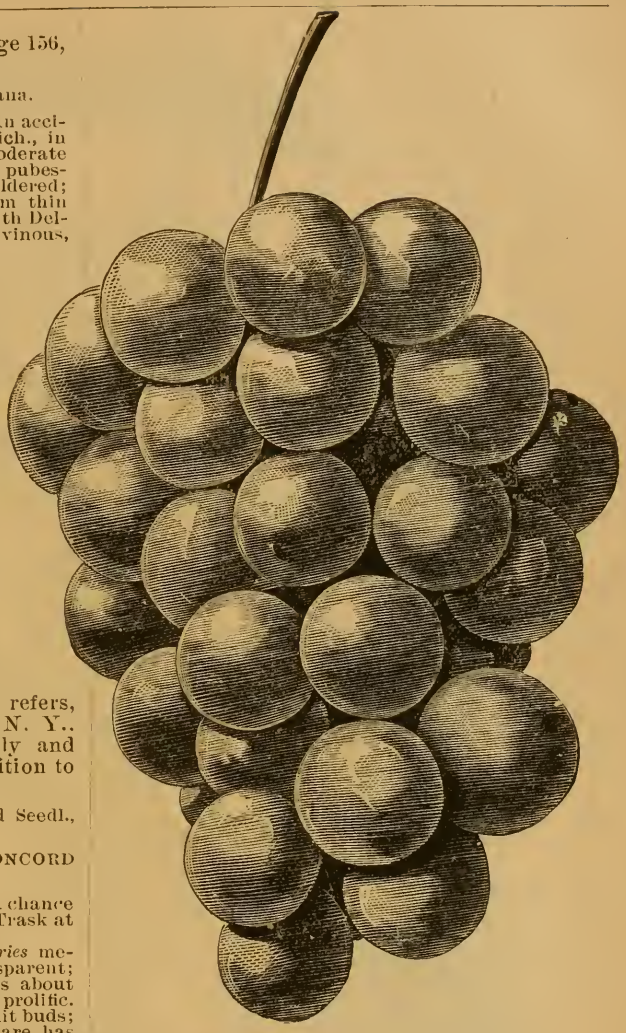
Roenbeck. (*Hybrid.*) Parentage unknown. A chance seedling, originated on the grounds of Jas. W. Trask at Bergen Point, N. J. First fruited in 1870.

Bunches long, compact, well-shouldered; *berries* medium size; *color* PALE GREEN; skin thin and transparent; *flesh* melting and very sweet, no pulp. Ripens about same time as the Concord. Vine hardy and prolific. Wood short-jointed and light-colored; large fruit buds; fruit needs thining out, as the vine, like Delaware, has a tendency to overbear. The foliage as well as other characteristics indicate *Vinifera* parentage, but its roots have not been attacked by the Phylloxera.

Rogers' Hybrids. These valuable seedlings were produced by E. S. Rogers in his small garden in Salem, Mass., from crosses of several foreign varieties upon wild Labrusca, the Mammoth *fox grapes* of Massachusetts. When first fruited (in 1856) they were designated by numbers only. Those to which he has given names in place of numbers, are placed, in alphabetical order, in their appropriate places,* but there are some remaining numbers yet unnamed which deserve special attention; they are equally handsome in appearance, of fine quality and are successfully grown in some localities:

No. 2. One of the largest of his hybrids. *Bunch* and *berry* very large, DARK PURPLE, nearly BLACK; thick-skinned and somewhat acid (ripening imperfectly with us, from loss of foliage, before maturing its fruit); *late* in ripening, and in flavor somewhat like the Catawba. Vine a vigorous grower and very productive.

*No. 1, Goethe.
No. 3, Massasoit.
No. 4, Wilder.
No. 9, Lindley.
No. 14, Gaertner.
No. 15, Agawam.
No. 19, Merrimac.
No. 28, Requa.
No. 39, Aminia.
No. 41, Essex.
No. 43, Barry.
No. 44, Herbert.
No. 53, Salem.

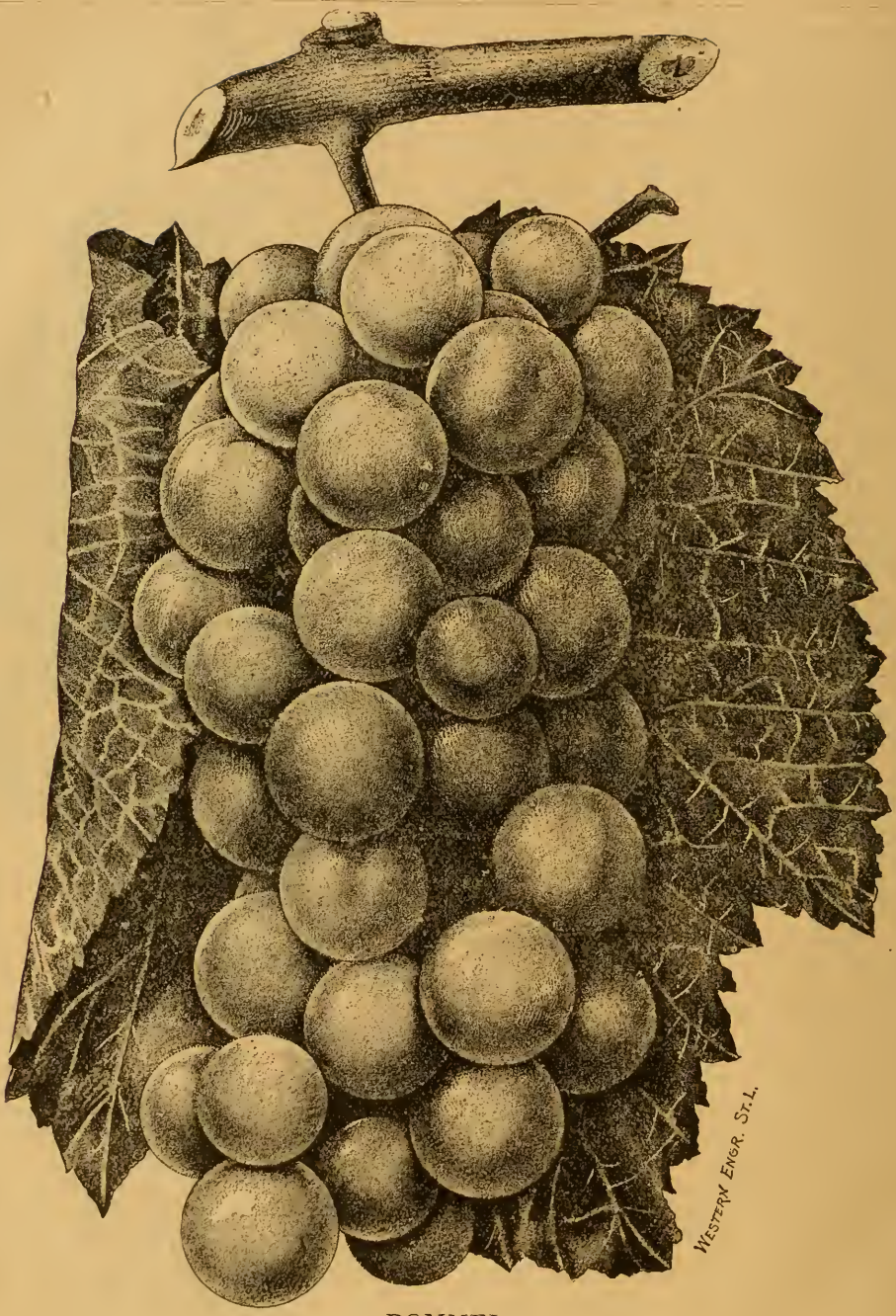


ROGERS' HYBRID. (No. 8.)

No. 5. One of the finest of Rogers' hybrids. *Bunch* medium to large, moderately compact; *berries* large, round, RED, sweet and rich; free from foxiness, ripens early. Vine hardy and healthy, resembles Lindley, but not as strong a grower.

No. 8. Considered by us as one of Rogers' *best*, and valuable for wine-making purposes. *Bunch* and *berry* large; color PALE RED, but the fully matured berries a COPPERY RED with fine light gray bloom; flesh sweet, juicy with pleasant flavor, and almost free from pulp. Skin about the same thickness as Catawba. Vine a strong, vigorous grower, with broad, thick and coarse foliage; hardy and productive. Its fruit is ripening later than most of his other varieties, and its foliage, under good culture, less inclined to mildew; for these reasons it is the more appreciated and largely planted by some experienced wine growers in Illinois, directly east of St. Louis.

No. 30. Vine vigorous and healthy; *bunch* medium; *berries* large, LIGHT RED; flavor very fine, much like the foreign Chasselas; pulp very tender. One of the best flavored of all the Rogers' grapes. Ripens early, but rather irregular as to date. Has proven generally satisfactory.



ROMMEL.

Rommel. (*Rip.-Hybr.*) A cross between Triumph and Elvira, produced by T. V. Munson, Texas, in 1885, named in honor of *Jacob Rommel*, of Missouri, and having the strong growth of the mother (Elvira) with greatly improved quality of the fruit. *Vine* vigorous, very hardy, healthy and productive. *Clusters* medium, compact and handsome: *berry* medium to large, color GREENISH-WHITE, translucent; skin thin and tough; pulp melting, seeds small and few. Quality pure, sprightly, vinous; ripening early, about the same time as Delaware.

A superior grape which, however, has disappointed us somewhat in the way the vine behaves here. It makes a fine white wine, and is recommended as a promising addition to our list of hardy grapes.

Rommel's Seedlings. Few persons have been as successful in the production of valuable, hardy and healthy seedling-grapes, adapted to general cultivation in a large section of this country, as Jacob Rommel, of Morrison, Mo. His grapes cannot rival those of Rogers or Ricketts in beauty and in fine quality as a fruit for the table or for family use, but they far surpass them in vigor and productiveness, and are of good quality, especially for wine and brandy. Those named and disseminated are described in this Catalogue. See AMBER, BEAUTY, ELVIRA, ETTA, FAITH, MONTEFIORE, PEARL, TRANSPARENT, WILDING.

Besides these, he has raised and fruited for several seasons quite a number of seedlings, from Taylor and from his Elvira, which promised to be valuable, especially for wine, but grape culture was very discouraging, on account of black rot, which became almost destructive in his locality. Moreover he found that those to whom he had sent of his new seedlings for testing, requesting only for rendering in time a true account as to their doings, did not report; none encouraged him as we did, in 1880, buying the wood of his original vine, Taylor Seedling No. 14, named by us, with his consent, "*Montefiore*" (q. v.); thus discouraged, he himself paid no further attention to his varieties, excepting *Elvira* (see descr. p. 124), which we introduced for him in 1875 and which soon became, now is and will long remain one of the leading white wine producing grapes of this country.

The *Elvira* is less afflicted by rot, even in unfavorable seasons, than most other varieties, and is so enormously productive, that it always yields a satisfactory crop, and it makes a very palatable light wine which can also be blended with other grape juice of any preferred flavor. For *red wine* there is again one of Rommel's seedlings, the *Montefiore*, which is very reliable, *not* prone to rot, and makes a very nice Claret wine, not as heavy as Norton's or Cynthiana, but mixed with these makes them more pleasant. Had friend Rommel never produced any other grape than *Elvira* and *Montefiore* his name would ever gratefully be remembered by our vinters. In his honor Prof. Munson has named one of his fine new varieties *Rommel*, and Hermann Jaeger designates one of his as *Elvira No. 100*.

Rothrock. (*Labr.*) See Alexander, page 84.

Ruby. (*Hybr.*) One of George Haskell's Seedlings (see remarks, p. 132) which Samuel Miller had on trial at Bluffton, Mo., and about which he writes us: It has now borne (December, 1893) two years, and is so fine that I intend propagating it. *Vine* hardy and very vigorous, bears a most excellent grape; above medium in *bunch* and *berry*; a regular RUBY in color (hence the name), and in quality *unsurpassed*.

Rulander or St. Genevieve. (*Æst.* ×) Syn., AMOUREUX, RED ELBEN. What we call here the Rulander is not the same vine known by that name in Germany, but is claimed to be a seedling from a foreign grape (Pineau) brought by the early French settlers to the western bank of the Lower Mississippi (Ste. Genevieve). Others consider it as a native belonging to the southern division of the Æstivalis class; and, while we ourselves incline to this view, we must admit that its short-jointed growth, tenderness, and liability to suffer from diseases support the claim of its having originated from foreign seed.

Bunch rather small, very compact, shouldered; *berry* small, dark PURPLISH-BLACK, without pulp, juicy, sweet and delicious. Vine a strong, vigorous, short-jointed grower, with heart-shaped, light green, smooth leaves, hanging on till late in November; very healthy, but requires covering in winter. It has very tough, strong *roots*, with a firm, smooth liber; wood hard, with a small pith and firm outer bark; and although it will not bear *big* crops, it makes up in quality as a wine grape what it may lack in quantity. It makes an excellent pale red or rather brownish wine, closely resembling sherry, which was repeatedly awarded a first premium as the best light colored wine. Must 100°–110°.

(See also LOUISIANA, page 150.)

Rutland. (*Æst.-Hybr.*) Supposed to be a seedling of Eumelan crossed with Adirondack; originated by D. S. Marwin, of Watertown, N. Y. Vine healthy and moderately productive: fruit in size and color like the Eumelan; *bunch* medium, compact, not shouldered; *berry* medium, BLUE-BLACK; the pulp is fleshy, does not separate easily from the seed, but is sprightly and vinous; quality very good; ripens a few days before Concord.

R. W. Munson. (*Linc.* × *Triumph.*) See Munson's Hybrids, page 159.

Salem. (*Labr.-Hybr.*) Rogers' No. 53. Like Agawam (No. 15) and Wilder (No. 4), this is a Hybrid between a native (Wild Mammoth), the female, and the Black Hamburg, the male parent. This was the most extensively planted and is probably one of the finest among the Rogers' Hybrids; it has proven satisfactory where Hybrid grapes succeed, and under favorable circumstances it produces a fine grape of excellent quality; to do so, however, it should be thinned severely, as it is inclined to overbear.

Bunch full medium to large, compact, and shouldered; *berry* large as Hamburg, ¾-inch in diameter, of a DARK CHESTNUT OR CATAWBA color; flesh tolerably tender, sweet, with rich aromatic flavor; a little foxiness to the smell, which is not perceptible to the taste; considered in quality one of the best; skin rather thick; seeds large; ripens nearly as early as Concord; it also keeps well. Vine very vigorous and healthy; foliage large, strong and abundant: wood of lighter color than most of the Rogers grapes. The *roots* are of medium thickness, branching, with smooth, firm liber, and have more of the native character than most other Hybrids; its vigor of growth in the shoots has hardly a parallel among Hy-

SALEM.

brids; it, nevertheless, generally fails in the Valley of the Mississippi and wherever mildew prevails.

The SALEM grape was originally numbered 22; a spurious sort having been put into the market under that number, it was changed by the originator to No. 53. But this did not help the confusion, and, to make it worse, he was reported to describe it once as of BLACK color (Journal of Hort., vol. 5, page 264), and at another time as of CHESTNUT or CATAWBA color, the latter generally adopted as the color of the true SALEM.

Sanbornton. (*Labr.*) See Isabella, page 141.

Sangamon. (*Labr.-Hybr.*) Raised by W. H. Lightfoot, of Springfield, Ill., from seed of Goethe (Rogers' No. 1.) Vine a vigorous grower, healthy and prolific. Bunch medium to large; berries large, color yellowish WHITE, juicy, very sweet; quality fine. A promising grape.

Saratoga. (*Labr.*) See Catawba Seedling, page 100.

Schiller. (*Æst.?*) One of Muench's seedlings of the Louisiana. Vine hardy; a vigorous grower, healthy and productive. Fruit of a PURPLISH-BLUE color, but light juice; otherwise quite similar to his Humboldt, p. 138.

SCUPPERNONG.

Scuppernong. (*Vitis Rotundifolia.*) Syn., YELLOW MUSCADINE. WHITE MUSCADINE,* BULL, BULLACE or BULLET, ROANOKE. This is exclusively a Southern grape; in South Carolina, Florida, Georgia, Alabama, Mississippi, and in parts of Virginia, North Carolina, Tennessee and Arkansas, it is quite a favorite, producing annually large and sure crops, requiring scarcely any care or labor. It is entirely exempt from mildew, rot, or any of the diseases so disastrous to the Northern species — entirely exempt also from Phylloxera; but it cannot be grown north of the Carolinas, Tennessee and Arkansas, nor even in Texas.

The type to which the Scuppernong belongs is not hardy about the 35th degree of latitude, hence it is purely a southern variety, and where other grapes frequently fail from fungous diseases or late frosts, this variety bears regularly and abundant crops.

We quote therefore only southern authorities and cultivators of the Scuppernong.

P. J. Berckmans, of Georgia: "I could not say too much in praise of the Scuppernong as a wine-grape. It is one of those things that never fail. *Of course I do not compare it with the Delaware and other fine flavored grapes;* but the question is — where, where shall we find a grape that will give us a profit? We have it in the Scuppernong. It cannot be grown as far north as Norfolk."

J. H. Carleton, El Dorado, Ark.: "It is called by some the 'lazy man's grape.' I admit the charge, and prize it the more on that account."

John R. Eakin, Washington, Ark.: "The vine takes care of itself; does not require and will not suffer pruning; bears abundantly and has no diseases. I scarcely think it a grape, but still a most useful fruit *sui generis*, and I hope will be cultivated by those who have no inclination for the more troublesome, and, I must say, the more exquisite 'bunch grapes,' as it is the habit of its friends to call the *Herbemont*, the *Catawba*, and others."

The *Scuppernong* grape was discovered by the colony of Sir Walter Raleigh, in 1554, on the Island of Roanoke, N. C., and the original vine is said still to exist there, being over 300 years of age. In appearance, wood, fruit, and habit, it is entirely distinct, or "*unique*," as Mr. Van Buren calls it. The V. Rotundifolia blooms two months later than either of our other varieties. The odor of the Scuppernong when ripening is delicious. The growth of the vine, or rather the space over which its branches extend in a series of years, is almost fabulous. The bark of the Scuppernong is smooth, of grayish-ashy color, variegated with many small, dot-like specks of lighter hue; the wood is hard, close-textured, firm; the *roots* white or creamy. The leaves, before dropping in autumn, become of a brilliant yellow.

Bunch or cluster consisting usually of only about 4 to 6, rarely more, large, thick-skinned pulpy berries; these are ripening in August and September, not all at the same time, but fall off successively, when ripe, by shaking the vine, and they are thus gathered from the ground. Color YELLOWISH, somewhat bronzed when fully ripe. The pulp is sweet, juicy, vinous, with a musky scent and flavor — a delicate perfume to some tastes, repugnant to others. It has, however, its warm advocates among American grape-growers, as will be seen by the following, from a letter of S. I. Matthews, of Monticello, Ark., written for this Catalogue:

"The Scuppernong makes a splendid white wine; its fruit, though ordinarily deficient in sugar, is very sweet to the taste, owing to its having but very little acid. The saccharine deficiency may also be accounted for, in a measure, by the fact that this grape has been hitherto, for the most part grown upon arbors, a plan of training that more effectually than any other excludes the sunlight and heat from the fruit, which it is the practice to gather by shaking down from the vines, whereby a considerable proportion of but partially ripe fruit is obtained. And yet, according to some tests, the Scuppernong has registered 88° on the (Oechsle) must scale, which would give 9 per cent. of alcohol.

"A. C. Cook thinks '*the Scuppernong is emphatically the grape for the South.*' Its juice is capable of being converted into the finest of Muscatelle sweet wines, or in superior light dry wines."

Mr. Matthews writes: "When it shall be planted on dry south hill-sides instead of on low moist bottoms; when it shall be trained on trellises, where the sun heat, both direct and reflected from the ground, shall bathe the fruit and foliage, instead of upon tall umbrageous arbors through which the sun's rays can scarcely penetrate; and when only the perfectly ripe fruit shall be carefully hand-picked, instead of being rudely shaken and all berries that will fall gathered and pressed

* The BLACK OR PURPLE grapes of this class are often *incorrectly* called "Black Scuppernong." Southern horticulturists designate them by different names: Flowers, Mish, Thomas, etc.

together, there will be little, if any, lack of sugar."

"But, even admitting this deficiency, it is the only demerit of this variety, and can be remedied either by adding pure sugar to the must, or by evaporating the water from a portion of the must and adding so much of the resulting syrup to the other as is needed to bring it up to the proper standard. Moreover, the true Scuppernong is the most productive and reliable grape for the *South*, and its cultivators plant therefore *mainly* of the Scuppernong and its class."

black; has a thin skin; sweet and tender flesh; is less in size than the Scuppernong, makes a fine wine, and is superior for the table. Ripens with the Scuppernong." Berckmans, of Augusta, Ga., describes it as follows: "Bunches from six to ten berries; berries slightly oblong, large, of a slight violet color, quite transparent; pulp tender, sweet, of a peculiar, delicate vinous flavor, quality superior to any of the type. Maturity middle to end of August. Has but little musky aroma and

Sub-Varieties of Scuppernong are:

EDEN. A Scuppernong Seedling, by Dr. Sam'l Hape, of Atlanta, Georgia. Vine identical in appearance and habit with Scuppernong. *Berry* very large and BLACK, with delicate Thomas flavor; often from 12 to 15 berries in a cluster; is a profuse bearer making an excellent brown wine, resembling Sherry, which Dr. Hape claims to be superior to that made from Hermann or Rulander.

FLOWERS. Is the latest of the very dark skinned varieties of this class. See page 127.

JAMES. Originated lately by J. Van Lindley, in Pitt County, North Carolina; said to succeed wherever the Scuppernong does; BLACK, large size, good quality and very prolific. Commences to ripen in July and continues till frost.

PEDEE. A sub-variety of Scuppernong; discovered on the Pe Dee river, South Carolina. Berry somewhat similar in color, but smaller; skin very tough, quality good, ripens one month later than Scuppernong.

TENDER PULP. A black skinned variety with pulp dissolving, sweet, of second quality, maturity from middle of August to middle of September.

THOMAS. (*Rotund.*) A variety of the *Scuppernong* species, discovered and introduced by Drury Thomas, of South Carolina, and thus described: "In color it varies from reddish purple to deep

makes a superior red wine. A spurious variety is sold under the name of Thomas; this is inferior in quality and produces a deep black colored fruit of no merit whatever."

There are a number of other varieties cultivated in some localities which have no decided distinctive characters to make them valuable, although they may have a local value, such as MISH, SUGAR-GRAPE, MEMORY, etc.

Scuppernong Hybrids. At the meeting of the Am. Pom. Society held in Baltimore, 1877, Dr. A. P. Wylie exhibited his remarkable hybrids for the last time before his death; among them, the fruit committee—consisting of Chas Downing of N. Y., Robert Manning of Mass., Dr. John A. Warder of O., Josiah Hoopes of Pa., P. J. Berckmans of Georgia, &c.—noticed "a most promising *Scuppernong*-hybrid from whose seedlings valuable results may derive."

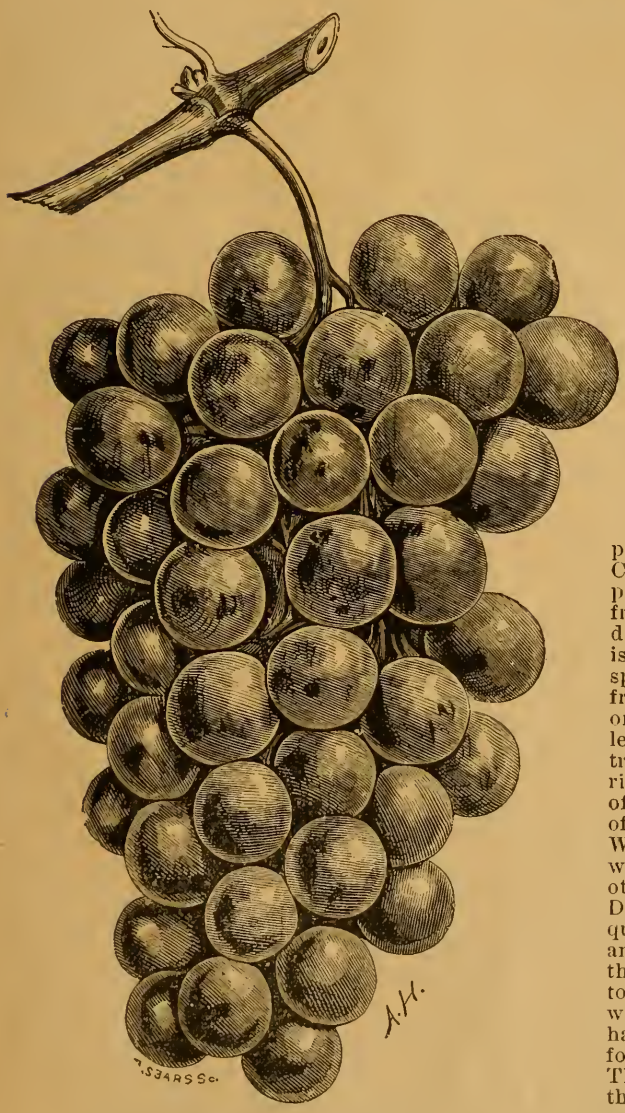
These remarkable seedlings which were originated by the late Dr. Wylie of Chester Co., South Carolina, are doubtless all lost. Vines were sent out to several persons by the originator, but so far as we can ascertain not one survived. It was supposed, and is still held by many, that the Rotundifolia cannot be crossed with other species of Vitis.

We are glad to know, however, and it will be interesting to Southern grape-growers, that Prof. Munson of Texas is now experimenting a number of *Scuppernong* and *Thomas* hybrids with *Herbemont*. These vines are very thrifty and beautiful; we anticipate their fruiting with anxiety.

Schuylkill Muscat. (*Labr.*) See Alexander, p. 84.

Secretary. (*Rip.-Hybr.*) Obtained by J. H. Ricketts, Newburgh, N. Y., by crossing the Clinton with Muscat-Hamburg. It was considered the finest new grape at the Massachusetts Horticultural Exhibition of 1872, and pronounced by Downing to be one of Ricketts' best in quality; but, being very much inclined to mildew and rot, it will remain a superb amateur variety, for some favorable localities.

Vine vigorous, hardy, of Vinifera character; *bunch* large, moderately compact, shouldered, with a large roundish-oval *berry*, BLACK with handsome bloom; its peduncle red at the base when drawn from the berry; flesh juicy, sweet, meaty, slightly vinous. Foliage like Clinton but thicker, and of about the same size.



THE SECRETARY GRAPE.

SENASQUA.

Senasqua. (*Labr.-Hybr.*) Raised by Stephen Underhill, Croton Point, N. Y., from Concord and Black Prince. Seed was planted in 1863 and the vine bore its first fruit 1865. The vine is vigorous and productive in rich soil; moderately hardy. It is one of the latest to open its buds in spring, and thereby less subject to injury from late frosts; it nevertheless ripens here only a few days later than Concord. The leaf is very large and firm, and shows no trace of foreign origin, except when it ripens, at which time, instead of the yellow of the Concord it takes on the crimson color of the mature leaf of the Black Prince. With us, at Bushberg, it did not succeed so well, and is not as desirable as Underhill's other grapes, the Black Eagle and Black Defiance. Clay soil is not best for Senasqua; it requires a light, deep soil. *Bunch* and *berry* varying from medium to large; the bunch is very compact, so much so as to cause the berries to crack; color BLACK with blue bloom; quality best. The fruit has the peculiar fleshy character of certain foreign grapes, with a brisk, vinous flavor. The originator himself does *not* recommend the Senasqua as a profitable grape for market purposes, but only as a fine and valuable amateur fruit. As such it is of

first rank, "of the highest quality to those who appreciate life and brilliancy in a grape." In France (Drôme and Lot-et-Garonne) this variety was considered one of the most recommendable of American Hybrids, provided it be planted in the right soil. We give in annexed figure, page 179, the likeness of a medium-sized cluster.

Seneca. (*Labr.*) Very similar to Hartford, if not identical with it. First exhibited at Hammondsport, N. Y., in October, 1867, by R. Simpson, of Geneva, N. Y.

Seneca. (*Labr.* ×) Originated by that remarkable old Horticulturist, the late John Burr, (see short biographical sketch, p. 121)—in what year and from what variety cannot be ascertained. There appears to be in his seedlings a regular progression from a lower to a higher type, conforming to Darwin's theory. SENECA was probably one of his earlier creations (while Evaline and Matchless were the last he fruited). Vine rather tender, evidently better adapted to the south of Kansas, yet healthy and productive even there and, so far, without either rot or mildew. *Bunch* large, compact, *berry* large, RED, tender, juicy, vinous, of Catawba flavor, ripens after Concord.

Sharon. Synonym for Cayuga (q. v., p. 100.)

Shelby. (*Labr.*×*Rip.-Hybr.*) Originated by D. S. Marvin, of Watertown, N. Y., from a combination of Labr. and Rip. with some other variety; he does not know its immediate parentage, but the fruit is most of Labrusca character whilst the vine resembles Riparia most; with a thicker, stronger leaf, resisting disease, vigorous and hardy; its habit and appearance suggests that it is a cross between *Elvira* and *Delaware*. *Cluster* short, compact; berry medium, WHITE; skin thick, tough, neither cracks nor drops off; juice sweet, pure, vinous; ranks in quality with Delaware; ripens very early, with Champion! Disseminated in Fall 1894. We recommend it for trial.*

Silver-Dawn. (*Labr.-Hybr.*) A seedling of *Israella* fertilized by pollen of Muscat-Hamburg, a brother of the *Early Dawn* out of the same bunch raised by Dr. W. A. M. Culbert, Newburg, N. Y. A fine white grape of best quality; vine hardy and vigorous.

Singleton. (*Labr.*) See Catawba, page 99.

Small German. See York Madeira, page 191.

Smart's Elsinburg. See Elsinb., page 123.

Snowflake. (*Labr.* ×) Originated by Dr. J. Stayman, of Leavenworth, Kas., from Burr's Jewel, which is disseminated by Dr. Stayman. It is a fine vigorously growing vine of the Labrusca type; hardy and productive; has not shown rot or mildew, so far; bunch medium, compact; berry large WHITE, tender but firm, juicy, sprightly vinous sweet; of very good quality; ripe about with Concord.

Spofford Seedling. See To-Kalon, page 181.

Springfield. (*Labr.*) Raised by W. H. Lightfoot, of Springfield, Ill., from seed of Northern Muscadine. A very good early wine and table grape. Vine strong, healthy and hardy; *bunch* medium to large, very compact; *berries* large, REDDISH BROWN, becoming DARK BROWN when fully ripe; pulpy, yet juicy and very sweet, ripening about a week before the Concord.

Spring Mill Constantia. See Alexander, page 84.

St. Catherine. (*Labr.*) Raised by Jas. W. Clark, Framingham, Mass. *Bunch* large, rather compact; *berries* large, CHOCOLATE color, rather sweet, tough, foxy. Not of much value.—*Downing.*

*Marvin has other Seedlings, of his production, on trial; has dug up and thrown away hundreds of them.

St. Albans. (*Labr.* ×) Originated by Jacob P. Bossung, of Jefferson county, Ky., crossing Ives' Seedling with pollen of Niagara; producing a BLACK Niagara; the best out of 128 seedlings of same parentage. The vine is a fair grower; hardy and healthy, has borne its fourth crop in 1893 and promises to be very good for market and wine.

Standard. (?) Raised from Delaware by the late John Burr, of Leavenworth, Kans., (about 1880.) Vine vigorous, hardy, healthy and very productive; inclined to overbear and somewhat subject to rot. Bunch large, shouldered, rather compact; berry large, nearly BLACK, juicy, tender, sweet and sprightly, vinous, quality very good, commences to color quite early, but ripens slowly, about same time as Concord; a superior market grape and makes a white or light colored wine of good body and fine aroma.

Stelton. (*Hybr.*?) Raised by W. Thomson, of New Brunswick, and referred to in Gardeners' Monthly of Nov., 1882, as one of the many late brilliant appearances in the viticultural sky. The *bunches* are about eight inches long, well-shouldered, rather loose; *berries* WHITE, about the size of *Croton*, and "not hard to take"; in flavor comparing favorably with Lady Washington. We have never seen it.

Storm King. (*Labr.*) See Concord Seedling, p. 107.

Superb. (?) Originated with A. F. Rice, Griswoldville, Ga. Said to have been raised from seed of the Eumelan, at Weymouth, Mass. Vine hardy and a good grower, with short-jointed stocky fine grained wood; leaf large, thick dark green and healthy; bunch large; berry medium; color BLACK with blue bloom; seeds medium; quality *Superb*, sweet and rich; flavor pure, not a particle of acid taste; pulp tender, brittle, juicy; skin thin but tough, flesh firm, a little similar to Malaga (?); does not crack or drop. It is said to be very productive; starting late, thus escaping late spring frosts. It ripens two weeks earlier than the Concord, and is an excellent keeper and shipper. Not disseminated, nor has it been tested as far as heard from, but was exhibited at the Columbian Exhibition, Chicago, 1893, and is specially mentioned as a seedling of Eumelan, very sweet, resembling Concord.

The very reliable editor of the Rural New Yorker, E. S. Carman, to whom a few bunches of this grape were sent in August, 1893, says it closely resembles its parent, the Eumelan, (see engraving page 126), which is "worth its weight in gold" in some places, and is next to worthless in most other places. The question is, will it succeed more generally than its parent? If not, it is worth a trial where the Eumelan succeeds.

Superior. (*Labr.* ×) Originated by John Burr from his Jewel (this variety and SUPREME were among the last seedlings he raised). Vine very vigorous, hardy, healthy and productive; supposed to be free from rot and mildew. *Bunch* medium, compact, handsome; *berry* medium, BLACK, very tender, juicy, sprightly, rich, sweet; quality BEST. Will hang on the vines long after ripe, but does not ripen quite as soon as *Jewel*, about five days later; it has shown neither rot nor mildew so far. Foliage and growth of the Labrusca type.

Supreme. (*Labr.* ×) Originated also by John Burr of Leavenworth, Kans. (see page 121). Vine vigorous, hardy, healthy, very productive. Although it is supposed to be a seedling of Delaware it has the growth and foliage of a Labrusca. Grape very BLACK; *bunch* medium, very compact; *berry* medium or under; flesh tender, sweet, without pulp; vinous, rich and sprightly; quality *best*; ripens nearly all at once and *extremely early*, about two weeks before Concord, from three to seven days earlier than JEWEL. It is a valuable early grape of high quality for table or market and claimed to be free from rot and mildew.

Talman or **Tolman.** (*Labr.*) See Champion, page 102.

Taylor or **Bullit,** often called Taylor's Bullit. (*Riparia,* accidentally crossed with *Labr.*)

The often continuous tendrils, or rather *irregular* alternation of *more* than two leaves with tendrils, with often only a third or fourth leaf without such a tendril—further, the more prominent Labrusca character in many of the Taylor seedlings—make it almost certain that the Taylor is a cross between Riparia and Labrusca.

This old variety was first introduced to notice by Judge Taylor, of Jericho, Henry County, Ky. It is very unproductive; it seems that the vines require other varieties to pollenize them, and spur pruning on old wood, to make them produce well.

Samuel Miller suggests to plant the Clinton among Taylor to fertilize them, but we find the benefits resulting from this system also insufficient to balance its many inconveniences; and yet we have seen Taylor vines grown by themselves on the "Souche" plan (trained in the shape of a small weeping-willow tree, allowing the canes to grow from the short top of the main trunk,) produce from five to ten lbs. per vine. The *bunches* are small but compact; *berry* small, WHITE to PALE AMBER, turning even to PALE RED, when perfectly ripe, round, sweet and without pulp. Skin translucent, very thin but tough. Vine a very strong, rampant grower, healthy and very hardy. It was largely and most successfully used, in France, as grafting-stock for European vines, as a protection against the Phylloxera; also in California. The Duchess of Fitz-James has 200 hectares (about 500 acres) in *Taylor* grafted with different varieties, all doing well. In some clayish limestone soils it seems not to do as well as in sandy clay, and especially in cool, moist grounds. *Roots* comparatively few, wiry and very tough, with a thin, hard liber. Its wine is of good body and fine flavor, resembling the celebrated Riesling of the Rhine. Some very valuable and promising seedlings of the Taylor have been introduced See *Elvira, Noah, Grein's Golden, Amber, Pearl, Transparent, Montefiore, Missouri Riesling, Uhland, &c.* See also Thomas S. Kennedy's Report on Taylor's Bullit Seedlings in Am. Pomological Society, Report 1883, page 133.

Tecoma. (*Labr.*) See Catawba Seedling, p. 100.

Telegraph. (*Labr.*) Syn., CHRISTINE. Raised by Mr. Christine, near Westchester, Chester Co., Pa., named and introduced about 1865 by P. R. Freas, editor of the Germantown *Telegraph.* Sam. Miller, of Bluffton, once considered it one of the most promising EARLY grapes, and we still consider it as far better than Hartford. *Bunch* medium, very compact, shouldered; *berry* medium, round to oval, BLACK with blue bloom; flesh juicy, with very little pulp, spicy and of good quality; ripens almost as early as Hartford. A constant and reliable bearer, but often lost by rot, and when the rot spares our crop, the birds destroy it in preference to other varieties ripening at same time. Vine a healthy, vigorous grower in rich soil, and very hardy. Deserves more extensive planting in northern States, where the summer season is short and rot is less destructive. *Roots* abundant, heavy, with thick but rather firm liber. Canes stout, of average length, crooked at the joint, with the usual number of laterals. Wood hard with medium pith.

Tenderpulp. (*Rotund.*) See Scuppernong, p. 177.

Themis. (*Labr.-Hybr.*) Probably the same as METIS (q. v.), by C. Engle, Paw Paw, Mich.: a seedling of SALEM, as are all his seedlings. Vine a strong grower, hardy, productive; *bunch* medium, short, compact, sometimes shouldered; *berries* large, CATAWBA COLORED, meaty, flesh firm, of good quality; ripens with Worden.

Theodosia. A chance seedling in the grounds of E. S. Salisbury, Adams, N. Y., claimed by its introducer to be an Æstivalis, but seems a cross of Labr. with Rip. *Bunch* very compact; *berries* BLACK, in size between Delaware and Creveling, quite tart, very early, and claimed to be a good wine grape. But at a grape test held at Hammondsport, the report showed for Theodosia the lowest amount of sugar, 63¼° by Oechsle's scale, with over 11 per mill. acid.

Theophile. (*Labr.*) Produced by T. Huber, of Illinois City, Ill. A showy white market or table grape, GOLDEN color when fully ripe. Bunch medium-sized, compact; berries of size about as Concord or Worden; pulp tender, sweet. None of Mr. Huber's varieties are disseminated, except for testing; he writes us: "I am not cut out for that business, and my vineyard is too remote from railroad lines." He is a plain, honest, German farmer and amateur grape-grower.

Thurmond. See Devereux, page 116.

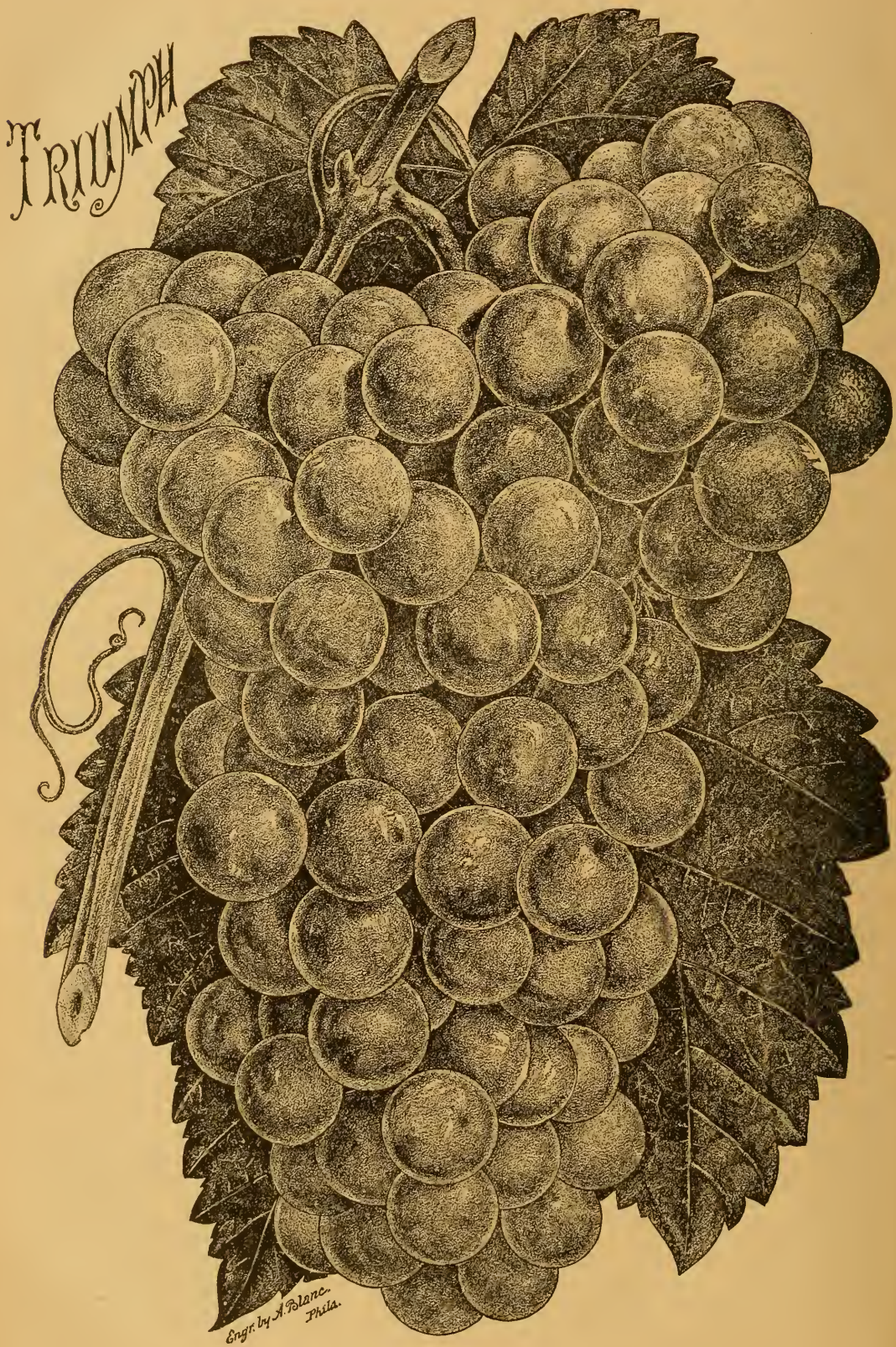
To-Kalon. (*Labr.*) Syn., WYMAN, SPOFFORD SEEDLING, CARTER. Originated at Lansingburg, N. Y., by Dr. Spofford, and was at first supposed to be identical with the Catawba. C. Downing showed that it was entirely distinct and at first highly recommended it for general cultivation, but soon afterwards found that it drops its fruit, is inclined to rot, does not ripen well, and mildews badly, and so stated; admitting, however, that "this grape is very fine, when you can get it." *Bunch* medium to large, shouldered, compact; *berries* varying in form from oval to oblate, nearly BLACK in color, and profusely covered with bloom; flesh sweet, buttery and luscious, without foxiness in its aroma and with but little toughness or acidity in its pulp. An early but a shy bearer.

Tokay. *Labr.* See Catawba, page 99.

Transparent. (*Rip.* ×) One of Jac. Rommel's Taylor Seedlings. *Bunch* small, compact and shouldered. *Berry* same size as Taylor, round, pale, GREENISH-YELLOW, *transparent,* gray spotted; skin thin, no pulp, very juicy, sweet and of fine flavor. Vine a very strong, rather long-jointed grower, resembling its parent in leaf and growth, but sets its fruit well; vine productive; was supposed to be free from mildew and rot, and promised to become a wine-grape of high character.

Trask. (?) A chance seedling that first fruited in 1875. Introduced by Peter Henderson & Co., New York, who furnished the following description: Vine not injured by Phylloxera (no pure American grape is, but this may be supposed to be of European Vinifera origin.—Ed.), and has not been known to mildew. Leaves smooth; bunches large, long, often shouldered; berries medium to large, BROWN or BLUISH-BLACK when fully ripe; without pulp, tender, melting, very sweet, vinous flavor; ripens before Concord.

Triumph. Campbell's Concord Hybrid No. 6. Was justly pronounced by Samuel Miller, to whom Campbell confided this variety for testing in Missouri, as one of *the most promising of all the white grapes.* It is a cross between Concord and Chasselas Musqué. (Syn., JOSLYN'S ST. ALBANS.) It has retained the vigor and general habit of foliage and growth of its parent; its fruit, however, is wholly free from any vestige of coarseness


TRIUMPH
Engr. by A. Blanc. Phila.

or fox flavor, or smell. *Bunch* and *berry* are very large; color WHITE, or, more correctly, PALE GREEN TO GOLDEN-YELLOW, nearly transparent with delicate bloom; skin thin, no pulp; flesh sweet, meaty; in unfavorable weather the berries are apt to crack (like Elvira); small seeds and few of them; it is a late grape, requiring a long season; ripens quite as late as Catawba, and on that account not recommended for the North or for any locality where the season is too short to ripen the Catawba or Herbemont, but the more valuable farther South; quality first rate; vine healthy and hardy, very productive and free from disease. Unfortunately the vines of this variety proved somewhat tender with us, suffering during severe winters if left unprotected. In favorable seasons the "Triumph" fully justified its name in our vineyards; it is by far the most attractive of all our white table grapes. Its bunches, grown in open air, with ordinary vineyard culture, are *very heavy;* those exhibited by us at the Miss. Valley Fruit Exhibition, in Sept., 1880, at the St. Louis Merchants' Exchange, were so much admired as to be honored with the premium for "*the best plate of grapes for the table*, and there were over 200 varieties on exhibition. *Samuel Miller*, of Bluffton, Mo., writes that it is the finest table grape we have for open air cultivation. Yet we cannot recommend it for *general* cultivation in *our* variable climate, but only for those who have the proper location and will give it proper care and attention. We know of no grape more worthy of it than the "*Triumph.*"

P. J. Berckmans, Augusta, Ga., writes us: "*Triumph* is truly well named; for years past it has proven to be the handsomest white grape we have, and of very good quality."

T. V. Munson, of Denison, Texas, pronounced it a great acquisition to the grapes *of the South.* "Had bunches weighing one-and-a-half pounds each, fine as Golden Chasselas in quality, vigorous and productive." One of these bunches was drawn from nature by his sister, Miss M. T. Munson, an excellent amateur artist, and kindly presented to us. The annexed illustration is an exact copy, *slightly reduced in size*, showing also partly two leaves, one upper and the other lower face. But, it can give only a faint idea of the beauty of this fine American grape.

T. V. Munson raised a number of seedlings and hybrids between Triumph and other varieties. (See Early Golden, Gov. Ross, *Rommel*, Big Extra, Bailey, Carman, Newman, Big Hope, etc.)

Trowbridge. (*Labr.*) See Isabella, page 141.

Tryon. See York Madeira, page 191.

Tuley. (*Æst.*) See Devereux, page 116.

U. B. (*Labr.*) See Marine's Seedl., page 151.

Uhland. (*Rip.* ×) A seedling of *Taylor*, grown by William Weidemeyer at Hermann, Mo. *Vine* a strong grower; long-jointed, grayish wood, with foliage resembling Taylor, but less vigorous; in some seasons of defective inflorescence a shy bearer, in others abundantly productive of excellent fruit, richer in sugar and flavor than most other Taylor seedlings, thus making a superior wine; but also more delicate, less robust, and requiring better soil and culture to obtain best results. *Bunch* medium, compact, sometimes shouldered; *berry* medium, slightly oblong, GREENISH-YELLOW in the shade, pale amber in the sun; skin thin, almost transparent, pulp tender, juicy, very sweet, of fine flavor. Ripens a few days after Concord.

Ulster. (*Labr.* ×) Syn., ULSTER PROLIFIC. A seedling of Catawba, said to be crossed with a variety of the *Æstivalis* class. Originated by A. J. Caywood, of Marlboro, Ulster Co., N. Y., attracted a great deal of attention at the meeting of the Am. Pomol. Society, held in Sept. 1883, at Philadelphia. The one branch there exhibited held fifty bunches fine red grapes, weighed twenty-two pounds, and was then considered a desirable red variety. Plant vigorous and very productive, inclined to set too much fruit, so much so, that it cannot ripen any, and being a feeble grower cannot recover afterwards; wood short-jointed, foliage thick, leathery, medium size. *Bunch* and berry of medium size, color RED, bright and attractive, of greenish color when shaded from the sun; quality good, very sweet; ripens with the Concord, keeps and carries well; skin thin, but tough. Has not been tested in the *West.* Ellwanger and Barry commend it as "one of the most promising sorts." In the East it appears to retain the favorable impression made upon its first appearance. J. C. Burrow who fruited it for years, at Fishkill, N. Y., finds it a good profitable market sort, but requires good culture and a fair amount of feeding (fertilizers.)

L. R. Taft, the Horticulturist of the Michigan Experiment Station reports (1894) "Ulster is high in quality and very productive, though slightly lacking in vigor.

Una. (*Labr.*) A white Concord seedling, raised by E. W. Bull, the originator of the Concord. Not as good nor as productive as Martha. *Bunch* and *berry* small, of a very foxy flavor. (See also page 107.)

Underhill. (*Labr.*) Syn., UNDERHILL'S SEEDLING, UNDERHILL'S CELESTIAL. Originated at Charlton, Saratoga Co., N. Y., by Dr. A. K. Underhill; pronounced as "of no more value than many other Fox-grapes" by Fuller, but considered by G. W. Campbell to be "of more value than the Iona for general cultivation." Now discarded by him also. *Bunch* medium to large, moderately compact; *berries* full medium, round, of Catawba color; pulp tender, sweet, rich and vinous, slightly foxy; ripens early, about with the Concord; vine a strong grower, hardy, healthy and productive.

Undine. (*Labr.* × *Rip.*) Originated by J. H. Ricketts, by crossing Concord and Clinton. Vine a vigorous grower with healthy foliage; bunch and berries size of Concord; color PALE GREEN, turning yellowish-white as it ripens; quality very fine, as most of his productions. See remarks on "Ricketts' Seedlings," p. 172.

Union Village. (*Labr.*) Syn., SHAKER, ONTARIO. Originated among the Shakers at Union Village, O. One of the largest of the native grapes we have, very showy, and one of the strongest growing vines. It is said to be a seedling of the Isabella, scarcely better in quality, but the bunches and berries are of the *size* of the Black Hamburgs. *Bunches* large, compact, shouldered; *berries* very large, BLACK, oblong; skin

thin, covered with bloom; flesh sweet when fully ripe, but of rather poor quality. Ripens late and unevenly. Might be used as parent for new varieties in preference to Isabella. Vine is a coarse grower but tender; requires protection in severe winters.

Uno. (*Labr.-Hybr.*) See Campbell's Juno, page 144.

Urbana. (*Labr.*) *Bunch* medium, short, shouldered; *berry* medium to large, round, WHITE-YELLOWISH in the sun, juicy, vinous acid, hard centre, aromatic skin. Ripens about with Isabella.—*Downing.*

Venango, or **Minor's Seedling.** (*Labr.*) An old variety, said to have been cultivated by the French at Fort Venango, on Allegheny river, about 100 years ago, but should be discarded now, when so many superior grapes can be grown. *Bunch* medium, compact; *berries* medium, round, often flattened by their compactness; color PALE RED, a fine white bloom; skin thick and tough; flesh sweet but pulpy and foxy, Vine a vigorous grower, very hardy, healthy and productive.

THE VERGENNES GRAPE.

Vergennes. (*Labr.*) A RED chance seedling, originating in the garden of Wm. E. Green, Vergennes, Vt.; fruited for the first time in 1874; but introduced about six years later. The *Vine* is a good grower, hardy, healthy and productive; the *leaf* large, downy and free from mildew; in our locality and further South it rotted and mildewed some. *Clusters* medium size; *berries* large, round, holding firmly to the stem; skin thick; color LIGHT AMBER to RED; covered with a thick beautiful bloom; flavor not rich, but pleasant, free from hard pulp; ripening a little after Concord, and possessing superior keeping qualities. As a winter grape it probably heads the list. This variety proves generally satisfactory, in some localities very desirable.

General Wm. H. Noble, gives the following recommendation to the Vergennes:—"For hardiness, vigor of growth, large bounteous fruitage, a fruit of richest tint of blended pink and purple bloom; for its yield of wine with the most delicate aroma; for its early maturity of wood and fruit; for its long-keeping quality, I think this the equal of any American grape." While this is excessive praise, which we would not indorse, the Vergennes is no doubt well worthy of attention. It has so far "held its own," and increased in popularity. The accompanying engraving is a true copy from a photograph of a medium-sized bunch.

Vesta. (*Hybr.-Labr.* × *Vin.*) Originated by C. Engle, of Paw Paw, Mich., from Rogers' No. 53, *Salem.* Vine very vigorous, hardy and productive of very handsome and large bunches and berries, of very clear WHITE color; the skin is thin but tough; ripens with Concord or a little later; quality very good.

Vevay. (*Labr.*) See Alexander, page 84.

Vialla. (*Rip.*) A Franco-American variety, recommended as a grafting-stock; resembles the *Franklin*, is by some supposed to be the same variety; others contend that it is distinct from and superior to *Franklin*, and that the Vialla produces more and better fruit. We incline to ascribe these differences to the effects of location, soil, etc. The President of the Agricultural Society of the Herault, in whose honor M. Laliman gave it that name, does by no means claim the Vialla nor the Clinton-Vialla as his productions.

Victor. (*Labr.* ×) See *Early Victor*, p. 121.

Victoria. (*Labr.*) T. B. Miner's best WHITE Concord Seedling. Vine hardy, healthy and productive; bunch and berry medium to large, moderately compact, with large shoulders, sometimes double; rather thick skin; pulp sweet, vinous; of good quality but foxy.

Victoria, Ray's. (*Labr.*) This variety has been introduced (1872) by M. M. Samuels, of Clinton, Ky., who describes it as follows: "*Bunches* and *berries* medium size, round, light AMBER color; skin thin; pulp tender, sweet and highly flavored; vine healthy, an abundant bearer, and a good but not rampant grower." This grape has been tested for a number of years in different parts of the South; it ripens there about the middle of August, and has been pronounced by some an excellent table grape.

It resembles *Venango*, and belongs to the same form of *Labrusca* as that variety and *Perkins*.

Vinita. (*Linc.*×*Herbem.*) See Munson's best Hybrid Grapes, page 159.

Vivie's Hybrid, produced by M. Vivie in France, and by some called Vivie's Hartford; said to be of very vigorous growth, very productive, and its grape of good quality, making a very good wine.

Walter. (*Æst.*×*Labr.*) Raised by that enthusiastic horticulturist, the late A. J. Caywood, of Poughkeepsie, N. Y., crossing the Delaware with the Diana. From the many premiums awarded to this grape, from the favorable reports by all who have seen or tested it for wine, it might claim to be a first-class grape. It labors under the disadvantage of having been represented as the climax of perfection by its originator, who honestly believed all he claimed for his seedling, and had distributed the same with great liberality and disinterestedness. The opinions on its true merits and adaptability for general cultivation widely differ according to localities. In those where vines are much subject to mildew, the Walter cannot flourish, it drops its foliage, and is far from desirable; but in favorable localities, *especially where the Delaware succeeds well*, there the Walter also proves a fair grower and a good bearer.

An eminent viticulturist of New York wrote us this year (1894): "The *Walter* chances to be one of my most reliable croppers; and certainly no grape excels it in aroma and flavor." But such grapes are rarely the most reliable!

In general appearance the characters of both parents, the Diana and Delaware, are discernible. The *bunch* and *berry* are in shape and color similar to Delaware. The illustration was made after a perfect bunch, exhibited by the originator, (reduced in size). Flesh tender, rich and sweet, with an agreeable spicy flavor, strongly reminding one of the Diana. The fruit is possessed of a most exquisite and delicate aroma, and a bouquet equaled by few other American grapes. Quality best, both for table and for wine. Ripens early, about the same time as Delaware. Vine, in moderately rich sandy soil, where free from mildew, a very fair grower, with dark-brown short-jointed wood; large tough leaves, green on the upper and lower surface, not perceptibly woolly. Must about 100°; acid 5 to 8 per mill.

Seedlings of Walter, produced by the late A. J. Caywood, are "*Mabel*" and "*Pokeepsie Red*," q. v.

THE WALTER GRAPE.

Warder. See Dr. Warder, page 147.

Warren. (*Æst.*) See Herbemont, page 134.

Warrenton. See Herbemont, page 134.

Watertown. (*Labr.* × *Vin.*) Syn., LAURA. Page 147.

Waverly. (*Rip.-Hybr.*) One of Ricketts' first efforts in the production of seedling grapes. It is a seedling of the Clinton and one of the Muscats. *Vine* very vigorous, hardy, healthy and productive; *leaves* moderately large, rather thick, slightly lobed, coarsely serrated; wood short-jointed; *bunch* medium, long, shouldered, compact; *berry* medium to large, oval, BLACK with thin blue bloom; *flesh* crisp, juicy, sweet, vinous, refreshing. The bunches want thinning out considerably.

Ricketts considers it one of the best BLACK grapes for amateur and family use.

W. B. Munson. (*Linc.* × *Triumph.*) See Munson's Hybrid, p. 159.

Weehawken. (*V. Vinifera.*) Raised by the late Dr. Charles Siedhof, of North Hoboken, N. J., from a seed of a grape from the Crimea. A WHITE grape of fine quality. Its foliage is very handsome, and decidedly foreign in character; its fruit fine; but only by grafting it on native roots, and careful nursing and covering in winter, can we obtain some of it in favorable seasons.

Welcome. (*Vinifera Hybrid.*) An exotic grape, raised by James H. Ricketts, being a cross between Pope's Hamburg and Canon Hall-Muscat. *Here* it can be grown in a cold or hot grapery only; for Southern California and part of Georgia, however, it may prove very successful. A vine planted at San Saba for testing shows a very vigorous growth, and the fruit is pronounced the very best; the *bunch* large, compact; the *berry* large, roundish-oval, BLACK with a thick grayish bloom; flesh very tender, juicy, sweet, refreshing, vinous, rich, aromatic. A first-class grape in every respect.

Wells. (*Labr.* ×) This large, showy WHITE grape originated in Ohio and was discovered there by a Mr. Wells, an amateur fruit grower, who requested and obtained a few cuttings with permission to grow and propagate therefrom. These were planted in Rich Hill, Bates county, Mo., and bore the first crop in 1885. Under the name of Wells' Seedling (after its first propagator) it was exhibited at the Kansas City and St. Louis Fairs, where it attracted attention on account of its color, large size, perfect bunch and peculiar flavor; it received first premiums at several fruit shows. C. I. Robards, of Bates county, Mo., its introducer, claims that, "the vine is a healthy, good grower with large, substantial foliage, bearing abundant annual crops; bunch and berry medium to above, about as large as Pocklington, moderately compact, color of a peculiar BRONZE shade; berries oval in shape, hanging well to the vine, of good quality, a good shipper and keeper. Has not been injured in winter with mercury 25° below zero; and has rotted but little, while on Concords near by more than half the bunches have rotted.

[By oversight we had not planted the Wells, received for testing, until 1893, hence have not fruited it. May prove valuable.]

Wemple. (*Labr.*) See Cuyahoga, page 111.

Wheaton. (*Æst.-Hybr.*) Originated by Dan. W. Babcock, Danville, N. Y., from Delaware Seedling. A WHITE grape; not yet tested.

White Ann Arbor. See Concord Seedl., p. 107.

White Beauty. (*Labr.* ×) Another seedling of the Duchess, originated by Dr. J. Stayman, of very fine quality. Vine vigorous, hardy, healthy and very productive; never rotted or mildewed on the ground where it originated; has strong Labrusca foliage; bunch large, long, double shouldered, compact; very handsome; berry medium, WHITE, firm but tender, juice sprightly, vinous, sweet, of best quality. Ripens about with Concord, and will hang on the vine long after ripe.

Our friend Sam. Miller, as also Mr. Van Trump, classed the White Beauty and White Imperial as the best white grapes.

White Cape. (*Labr.*) See Alexander, page 84.

White Catawba. (*Labr.*) See Catawba Seedl., p. 100.

White Cloud. (*Labr.* ×) One of three sisters produced from Duchess by Dr. J. Stayman, of Leavenworth, Kan. Vine in vigor, hardiness, proclivity and foliage like White Beauty, and is, so far, exempt from fungoid disease. Bunch large, compact, handsome; berry above medium, WHITE, tender, juicy, sprightly, vinous, sweet; quality best. Ripens about with Concord and will hang on the vines long after ripe.

White Delaware. A pure Delaware seedling, originated with George W. Campbell, of Delaware, O. The vine is in some localities more vigorous and robust in habit than the Delaware under the same conditions and circumstances; its foliage is large, thick and heavy, in flavor it seems equal to the old Delaware. Its main fault is want of size and productiveness; the *berries* and *bunches* will both rather fall below than go above the size of Delaware. In *form* of bunch and berry it is like the Delaware, compact and shouldered; color GREENISH-WHITE with thin white bloom. Ripens early. Not very productive.

Another "White Delaware" seedling has been raised by Hermann Jaeger, of Neosho; while the bunch and berries closely resemble the Delaware in shape and size, it has otherwise some characteristics of a *Labrusca.*

White Delaware Seedlings have also been produced by Jacob Rommel, by the late John Burr, J. Sacksteder, Dr. J. Stayman, D. B. Woodbury and others, but were no improvement and mostly not disseminated.

Whitehall. (*Labr.*) An early black grape, supposed to be a chance seedling, originated on the grounds of Geo. Goodale, in Washington county, N. Y., and said to be nearly two weeks ahead of the Hartford. This grape is described to be of the size of the Isabella; *bunch* large and moderately compact, color DARK PURPLE; *berries* thin-skinned and adhering well to the stem; pulp tender, melting, and sweet. The vine a good grower, productive and hardy. With us, here, it has proved neither very productive nor as early as was claimed for it.

White's Hybrids. Too late for insertion in the early pages of this Descriptive Catalogue, we received from N. B. WHITE, *of Norwood, Mass.*, a list of his Hybrids with corrections as to their parentage, which are as follows:

AUGUST GIANT, OCCIDENTAL, ORIENTAL, NORWOOD and NORFOLK are all produced from seed of Wild Labrusca crossed by Black Hamburg.

AMBER QUEEN, BAY-STATE and BLACK MADEIRA are produced from seed of *Marion,* crossed by Black Hamburg.

INTERNATIONAL, considered the best of his collection, originated from *Marion* seed crossed by White Frontignan; and CONTINENTAL from Black Hamburg seed crossed by Riparia and Labrusca Hybrid.

These varieties have not received the attention they deserve; their originator being an unobtrusive, though enthusiastic and careful viticulturist, working during the last quarter century, on the improvement of the American grape.

White Imperial. (*Labr.* ×) A sister of White Beauty, produced by Dr. J. Stayman from the Duchess. Vine very vigorous and productive, with foliage much like White Beauty, and though generally free from rot, it suffered some little from this disease in unfavorable seasons, but not as badly as Concord on the same grounds. Bunch large, long, double shouldered, compact; berry medium, WHITE, tender, juicy, sprightly and spicy, sweet with an exquisite flavor. Ripens

soon after Jewel, or about a week before Delaware; it is one of the first of the white grapes to ripen, and will hang on the vine long after ripe.

White Jewel. (*Rip.* ×) A cross from Elvira, raised either by the late John Burr or by Dr. J. Stayman, growing on the grounds of both, and the original vine lost. Vine vigorous, hardy and immensely productive, four, often five bunches to a shoot; as free from rot and mildew as its parent, the Elvira. Bunch handsome, medium size, rather long, very compact; berry medium, WHITE, tender, very juicy, sprightly, sweet; quality very good. Ripens very early, about with Jewel, which is now considered our earliest grape.

White Muscat of Newburg. (*Labr.* ×) A seedling of *Hartford* fertilized by pollen from *Iona*, raised and exhibited by the late Dr. Culbert, of Newburg, N. Y., in 1877. Vine hardy and a vigorous grower; bunch and berry of fair size. It has a fine Muscat aroma, or, rather, a toned-down foxiness. Some confound this variety with White's Northern Muscat (*Labr.-Hybr.*), originated by W. T. White, of Troy, O., said to be known also as the Culinary grape; foxy and inferior, with very large berries, partly GREEN and partly light dull RED. (Not known to us.)

White Ulster. *Labr.* ×) Originated by the late A. J. Caywood from a seedling of his Ulster Prolific crossed with White Concord. An amateur variety.

White Virginia Seedling. See Norton's, by Balsiger; see also same by Langendorfer, p. 164.

WILDER. (Rogers' Hybrid No. 4.)

Wilder. (*Labr.-Hybr.*) Rogers' No. 4. This is one of the best and most popular of the black varieties for the market, its size and beauty being equaled by its vigor, hardiness and productiveness,—where rot and mildew are yet unknown, and admit of the successful culture of any hybrids. Where these diseases prevailed, they can hereafter be prevented, we hope. (See Dr. Galloway's article, page 58 of this catalogue.)

Bunch large, often shouldered, sometimes weighing a pound; *berry* large, globular; color dark PURPLE, nearly black, slight bloom, resembling Black Hamburg. Flesh tolerably tender, with a slight pulp, juicy, rich, pleasant and sweet. Ripens with and sometimes earlier than the Concord, keeping for a long time. The vine is vigorous, healthy, hardy and productive; *roots* abundant, of medium thickness, straight, with a smooth, moderately firm liber. Canes heavy and long, with well-developed laterals. Wood firm, with a medium pith. The character of the cluster and leaf is shown in the annexed figure, p. 187.

Many seedlings of the Wilder were raised and exhibited, which showed considerable variation in size and color of berries, ranging from deep blue-black to red, but none were considered improvements upon the parent.

Wilding. (*Rip.* × *Labr.*) One of Rommel's seedlings, quite different from all his other grapes. *Vine* of a vigorous growth, hardy and healthy; *bunch* small to medium in size, loose, shouldered; *berries* very PALE GREEN, almost white, transparent, round, of full medium size, juicy, very sweet, no pulp; skin very thin and tender. Ripens with Concord. It is an exquisite table grape for family use, but unfit for marketing; it makes a delicious wine.

Willie. (*Labr.*) A seedling of Northern Muscadine, or perhaps a cross of Concord on this variety, produced by L. C. Chisholm, of Spring Hill, Tenn. Vine a rampant grower, with long jointed canes, healthy in foilage and fruit; clusters large, shouldered, resembling Concord; skin BLACK, rather tough, containing much coloring matter; ripens a few days later than Concord. It is of decidedly strong Labrusca type, but almost free from the foxiness of this class. Dr. Chisholm, produced some very promising seedlings from Willie.

Willis. (*Æst.-Hybr.*) Claimed to be from Delaware seed, by its originator, W. W. Jones, Camargo, Ill., who sent this grape to the Ohio State Hort. Society, Dec., 1879. The *bunches* are of fair to good size, very compact, often conspicuously shouldered, and the *berry* of full medium proportions, round, and from PALE GREEN to amber yellow; flavor good; flesh very tender, no pulp, rich and sweet. It was considered promising.

After a very severe winter, though unprotected, in September, 1881, Prof. T. J. Burrill testified that not the least appearance of injury could be found. He described the *Willis*, as there seen: "Of vigorous growth, not so rampant as Concord, but producing about an equal amount of fruit; wood hard, joints inclined to be short; leaves remarkably thick and leathery, with a dense, dark-colored tomentum beneath. The vine has nothing of the appearance of foreign parentage—the fruit certainly has."

Wilmington (?). A white grape, originated near Wilmington, Del. *Vine* very vigorous, hardy; *bunches* large, loose, shouldered; *berries* large, round, inclining to oval, GREENISH-WHITE, or, when fully ripe, yellowish; flesh acid, pungent. Not desirable. Ripens late.—*Downing.*

Wilmington, Red. (*Labr.*) Syn., WYOMING, RED. Raised by Dr. S. J. Parker, Ithaca, N. Y., and, according to Fuller, "nothing more than an early red Fox-grape, but little better than the old Northern Muscadine," and Fuller is always right. It is, at best, but a slight remove from the wild type. The *Horticulturist*, of November, 1874, speaks of the *Wyoming Red* (probably the more correct name) as being rapidly diffused and much in demand there as an *early* profitable grape. Said to be double the size of Delaware, which it resembles (!) in appearance. *Bunch* small, compact, and handsome. *Berry* small to medium, BRIGHT RED; skin thin and firm; flesh sweet, very foxy. Vine good grower, healthy and hardy, but mildews in unfavorable seasons.

Winchell. (*Labr.*) See Green Mountain, with which it is identical, page 130.

Winne. (*Labr.*) See Alexander, page 84.

Winslow. (*Rip.*) Originated in the garden of Chas. Winslow, Cleveland, O. The vine resembles Clinton, is hardy and productive; the fruit matures very early, and is less acid than Clinton; *bunch* medium, compact: *berry* small, round, BLACK. Flesh reddish tinge, some pulp, vinous, juicy.—*Downing.*

Witt. (*Labr.*) A pure *white* Concord seedling, originated by the late Michael Witt, of Columbus, Ohio. *Vine* hardy and healthy, moderate in growth and foliage; large in clusters and berries, very productive; though not as strong in growth as the Concord, but better in quality; of very fine flavor. "An admirable grape, highly recommended." Ripening eight days before Concord. It is one of the *best* of its class. Was awarded a first premium in 1885 at the Ohio State Fair, for best new seedling grape. An objection to this variety is that the berries often vary in size from medium to very large. It is quite difficult to propagate, and this will prevent its rapid increase or sale at low price for large planting. (See also White Concord Seedlings, page 107.)

Wolfe. (?) See York Madeira, page 191.

Woodbury. (*White* seedling of Delaware.) Originated by D. B. Woodbury, Paris, Me. The vine resembles the Delaware in growth and foliage; bunch medium, compact; berry larger than Delaware, slightly oblong, GREENISH-WHITE with fine bloom; skin thin yet tough, almost transparent; quality good, juicy and sweet; ripens two weeks before Concord and is a very good keeper; a promising early grape.

Woodruff. (*Labr.*) Syn., WOODRUFF'S RED. Originated with C. H. Woodruff, Ann Arbor, Mich., in 1874; a chance seedling, supposed to be a cross between Catawba and Concord. This grape has been well tested in various sections, from Canada to Georgia, and is favorably reported on, specially as a profitable market variety; it may, therefore, be recommended for general cultivation in many localities.

WOODRUFF.

The *vine* is vigorous, short jointed, healthy and very productive; of "iron-clad" constitution; exposed during our severest winters without injury. Its *foliage* is also one of the healthiest of the Labrusca class. *Bunch* and *berries* are very large and attractive, in color similar to *Salem;* and though somewhat foxy, not to *our* taste, many competent judges pronounce the fruit of the Woodruff Red as of very good quality. It ripens *early* and is a good long keeper, does not crack nor drop from the stem, but in some localities does *not* ripen earlier than Concord and does not keep well.

This variety supplies a long felt want; it is now occuppying as a RED market grape the same position as the Concord and Worden among the black ones. Geo. W. Campbell remarked: "Much has been said against the quality of this grape by eastern grape-growers;—it may not be adapted to their soil and climate; but the demand for it has increased largely each successive year, with many expressions of satisfaction from those who have successfully grown and fruited it; I found it, to my taste, equal to the Niagara or Pocklington."

G. B. BRACKET says: "Woodruff (red) seems well adapted to this locality (Iowa). Hardy, abundant bearer, large, compact bunches and remarkably free from disease; it has escaped black rot when other varieties all around it have been affected by it."

SAM MILLER says: "Taking all things into account I deem Woodruff's Red the most valuable of the red grapes. Bunch and berries very large; quality excellent." I have no doubt that it will make also a very good wine."

Some growers again pronounce the Woodruff *bunch* small, quality poor, pulpy and foxy; yet admit that it is productive and handsome. Occasionally the Woodruff is over productive to such extent as to seriously affect the quality of the fruit, and this explains the unfavorable testimony just quoted and its variable quality.

REINECKE. A seedling of *Woodruff red*, resembling it in every respect, was produced by Rautenberg, of Lincoln, Ill. Not being superior in quality nor sufficiently distinct in other characteristics, it should not be disseminated as a different variety.

Woodward (*Labr.*) See Isabella, page 141.

Worden. (*Labr.*) SYN., WORDEN'S SEEDLING. Raised by S. Worden, Minetto, N.Y., from Concord seed. It has very nearly the health, vigor and productiveness of the Concord, whose place it is gradually taking in some places; it has the same tenderness of skin, softness of pulp and non-keeping qualities which render it difficult to ship it successfully to market; otherwise it might even supersede its distinguished parent. In character and appearance like its parent, only a few days earlier in ripening, and in quality distinct from Concord, with a peculiar superior flavor; *bunch* large, compact, handsome, shouldered; *berry* large. BLACK; skin thin, flesh sweet, much like Concord, but generally regarded as a better grape. It is doing poorly in the South, but desirable in the Northeastern or North Atlantic States, where it ripens more perfectly, being one week earlier, and seems less subject to rot than the Concord. It is now very popular and largely planted for vineyards and gardens. (See Concord, p. 107.)

Worthington. (*Rip.*) See Clinton, page 103.

Wright's Isabella. See Isabella, page 141.

Wylie's Hybrids. "Too much can scarcely be said in praise of Dr. Wylie's persevering efforts in the improvement of the grape."—*P. J. Berckmans, Chas. Downing, Thomas Meehan, W. C. Flagg, P. T. Quinn*, Committee on Native Fruits, of the American Pomological Society. (Proceedings 1871, page 54.)

This testimony, and the excellent character of these hybrids as regards flavor and general appearance, entitled them to special attention, and we gave them a place in our Catalogue, third edition, 1883. Few persons can appreciate the immense labor and perseverance which his experiments have cost. Most of them failed from mildew and rot. In 1863 he had over one hundred promising seedlings, but during the war his vines were ruined.

In 1868 Dr. Wylie planted again one hundred seedlings, and, after many failures to produue seedlings of hybrid Scuppernongs, he finally succeeded; but, owing to a little hot-house being over-heated, he again lost nearly all of them. Then, on the 27th of April, 1872, a frost killed all kinds of grape-vines in that section. Again, in November, 1873, his residence was burned, and Dr. Wylie went back again to his old place, experimenting and working with the same zeal and enthusiasm as ever, wishing "*if I were only young again—with the experience I have!*" But in the fall of 1877 Dr. Wylie died. Shortly before his demise he had favored us with a friendly personal letter, from which we extracted descriptions of quite a number of his hybrids (published in our Catalogue, third edition, pp. 147 and 148); but, with the exception of three—"*Peter Wylie*," "*Berckmans*" and "*Mrs. McClure*"—none of his varieties were disseminated. All the others are doubtless lost.

Peter Wylie. (Parentage, *f.* Halifax and Foreign, *m.* Delaware and Foreign.) WHITE; transparent, becoming golden-yellow when fully ripe; *bunches* and *berries* above medium size, between Delaware and Concord, excellent in quality and meaty, with a peculiar delicate Muscat flavor. A vigorous, short-jointed, rapid-growing vine, with thick native leaves; holds its leaves until fall and ripens its wood thoroughly.

Wylie's Berckmans. See description, page 90.

Wylie's Mrs. McClure. See description, p. 159.

Wyoming or **Wyoming Red.** See *Wilmington Red*, page 188.

Yankee. (*Labr.*) A WHITE Concord seedling grown by J. W. Gray, Atwood, Ills.

Yellow Muscadine. See Scuppernong, p. 177.

Yoakum. (*Æst.*) Resembling the Herbemont; its juice is of deeper color, its foliage is more deeply lobed, but otherwise much inferior; ripening unevenly and being less productive. It has therefore been abandoned in most localities.

Yonker's Honey Dew. (*Labr.*) See Hartford, page 132.

York Lisbon. (*Labr.*) See Alexander, page 84.

York Madeira. (?) Syn., BLACK GERMAN, LARGE GERMAN, SMALL GERMAN, MARION PORT, WOLFE, MONTEITH, TRYON. An old variety, supposed to be a seedling of Isabella; originated at York, Pa. French viticulturists classify it as a *hybrid.* MARÈS finds in the structure of its roots great analogy with the Æstivalis, and that it is difficult to classify. *Bunch* medium sized, compact, and generally has a small shoulder; *berry* of medium size, roundish-oval, BLACK, thickly covered with a light bloom; juice slightly reddened, sweet, vinous, not very rich; skin somewhat pungent, and not much toughness in its pulp when fully ripe, which is about same time with Isabella. The vine is not very hardy, short-jointed, moderately vigorous and productive, but often losing its leaves, and consequently failing to ripen its crop.

Charles Canby, of Wilmington, Del., introduced the same variety as *Canby's August. Hyde's Eliza* (Catskill, N. Y.) is probably also the same grape.

The "York Madeira" is now almost entirely discarded and but rarely found in its native land, America, but in FRANCE it obtained a certain importance and celebrity. M. Laliman, of Bordeaux, first recommended it as remarkably free from phylloxera and worthy of propagation, and it was found to adapt itself very well to various soils. Though its fructification is not satisfactory in quantity, its grapes gain under that climate in richness of color and sweetness, and its vigorous growth recommends it as a grafting-stock; but as such also it is inferior to the *Riparia.*

Young America. (*Labr.*) See Concord Seedling, page 107.

Zelia. (*Hybr.*) Produced by C. S. Copley, of Staten Island, N. Y. Vine of medium, strong growth, quite hardy and productive. The leaves are five-lobed, some indistinctly so; dull green, lighter on the under side; very coarsely notched on the edge; foot-stalks green, wood light brown. Bunch and berries both very large; one bunch weighed 1 pound 6 ounces; BLACK with a fine bloom; it sets very close; skin thin, does not crack; no pulp, rather meaty, very rich, sweet, aromatic flavor, not a trace of fox; ripens early, before Concord.

Zita. (*Æst.*) A seedling of the Delaware, originated by John Sacksteder, of Leavenworth, Crawford county, Ind. Vine of healthy, vigorous growth, has borne four satisfactory crops without sign of disease; bunch above medium; berry medium, round, color YELLOW, a good bearer of best quality.

ABBREVIATIONS.

Sometimes used in the text of Descriptions, to designate those divisions of our country where the Variety is at home or believed to succeed.

N. A. S. for North Atlantic States, viz.: Me., N. H., Vt., Mass., R. I., Ct., also N. Scotia.
M. A. S. for Middle Atlantic States: N. Y., N. J., Penna., Del., Md., Va., W. Va.
S. A. S. for South Atlantic States: N. C., S. C., Ga., Fla.
N. C. S. for North Central States: Mich., Wis., Minn., Iowa, Dak., Nebr., also Ontario.
C. S. for Central States: Ohio, Ky., Tenn., Inda., Ills., Mo., Kans.
S. C. S. for South Central States: Ala., Miss., La., Tex., Ark.

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II. INDEX TO DESCRIPTION OF VARIETIES AND SPECIES.

The Standard names are in SMALL CAPITALS, (the leading varieties or most prominent novelties in LARGE CAPITALS); the Synonymous names in *Italics;* Discarded old varieties and new ones but little known or undisseminated are in ordinary Roman type. Varieties marked by a * are illustrated. Species of Vitis are in **GOTHIC TYPE.**

SIZE and COLOR, with reference to the berry, are designated as follows:

● ● • black, or nearly so, when fully ripe.
◍ ◍ ◍ reddish, or coppery brownish amber.
○ ○ ◦ greenish white or yellowish.

} The size of these signs being large, medium or small, to denote the size of the berry.

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ERRATA:

Page 20. Caribeea, read: Caribæa.
" 20. Blanconii, read: Blancodii.
" 22. Dean's grape, read: Doan's grape.
" 25. V. Campini, read: V. Champini.

Page 25. Under V. Candicans, on old vines, read: on young vines; on young vines read: on old vines, entire,
Page 29. After Vulpina, insert *Gray*.

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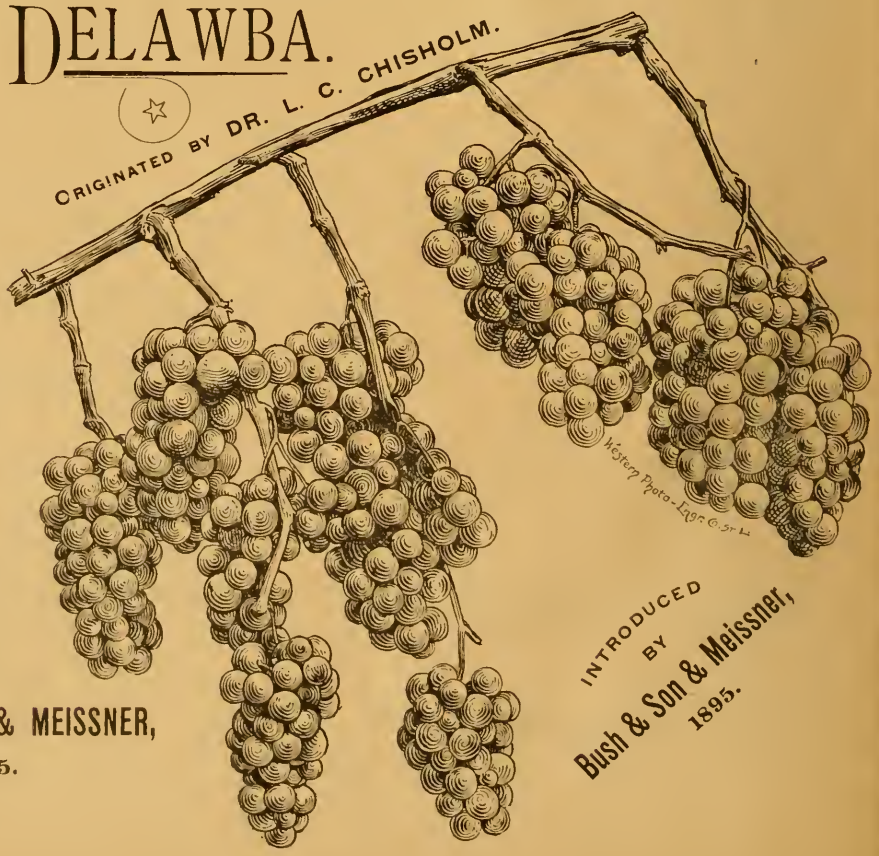

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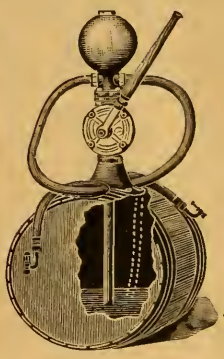

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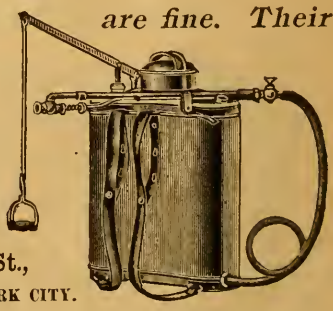

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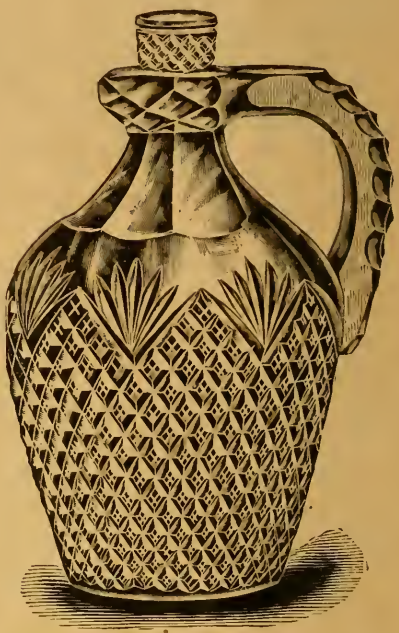

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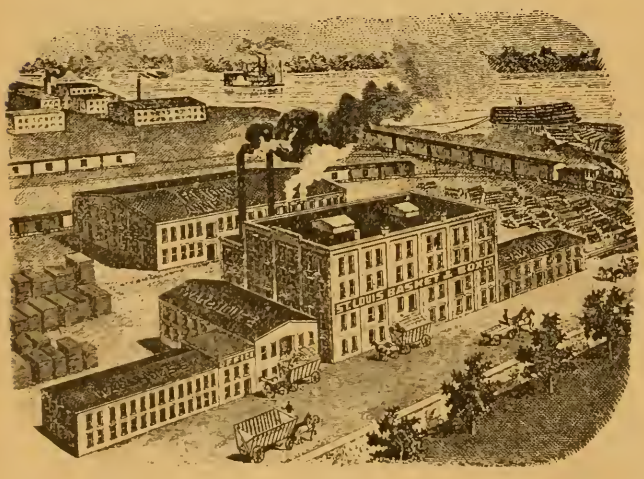

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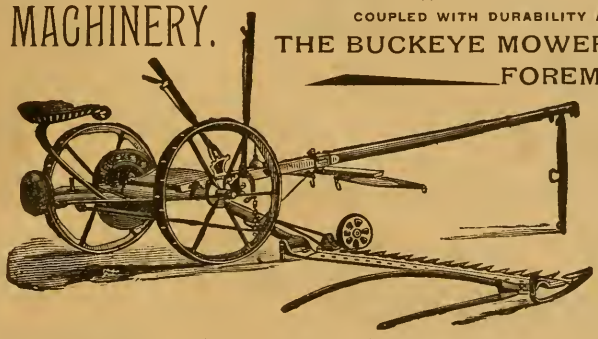

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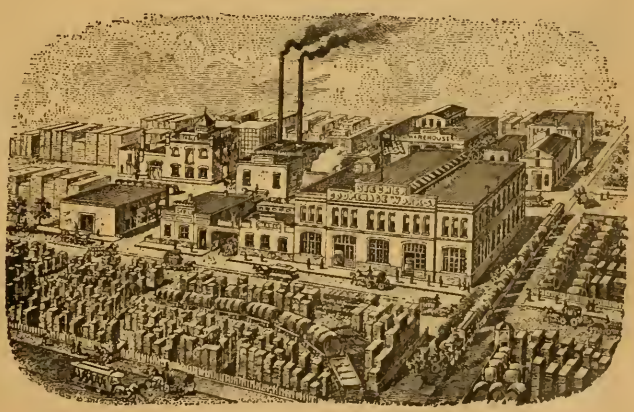

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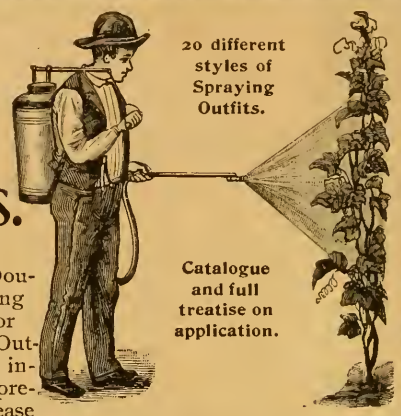

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